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ABSTRACT

This report reviews five studies dealing with drug abuse and adolescence and presents an overview of the social changes which have contributed to the increased use of marijuana and other illicit drugs. The importance of the longitudinal study as a research tool is emphasized in describing the research projects that deal with the epidemiology of drug use, personality and sociodemographic factors, peer influence, the relationship between delinquency and drug use, and its biomedical consequences. The report closes with an executive summary, discussion, and suggestions for further research. An annotated list of NIDA (National Institute of Drug Abuse) research monographs is included. (JAC)

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Drug Abuse and the American Adolescent

Editors:

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NIDA Research Monograph 38

A RAUS Review Report

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Drug Abuse and the American Adolescent

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Preface

The Research Analysis and Utilization System (RAUS) is designed to serve four functions:

- Collection and systematic classification of findings of all intramural and extramural research supported by the National Institute on Drug Abuse (NIDA);
- Evaluation by scientific peers of the latest research findings;
- Regular dissemination of findings to researchers in the field and to administrators, planners, instructors, and other interested persons;
- Provision of a feedback mechanism to NIDA staff and planners so that administration and monitoring of the NIDA research program reflect the very latest knowledge gleaned from research in the field.

Since there is a limit to the number of research findings that can be intensively reviewed annually, four subject areas are chosen each year and subjected to a thorough review. The reviewers, distinguished scientists in the selected field, are provided with copies of all pertinent literature and reports from NIDA-funded research. They are invited to add to this any information derived from their own research and that of colleagues not funded by NIDA. Each reviewer writes a state-of-the-art paper in his or her particular subject area. These papers make up a RAUS Review Report in the NIDA Research Monograph series.

Additionally, an evaluative meeting is held for presentation of the papers and exchange of ideas among the scientists and with NIDA staff. This meeting has sometimes been referred to as the "therefore" meeting: Here is our position: *therefore*, where are we going next, and where should further research lead? Should we alter our path? Step up NIDA support because new needs have arisen or new developments hold special promise? Discussions at the meeting and the specific recommendations of the experts in the field provide a basis upon which NIDA evolves its plans for future research.

In Fiscal Year 1980, Drug Abuse and the American Adolescent was chosen as an area for RAUS review. The review centered on the epidemiology of drug abuse among American adolescents, with particular emphasis on marijuana use because this is the most prevalent type of illicit drug used by adolescents. The factors which contribute to the

init
were also covered.

Dr. Denise Kandel, who chaired the meeting, has presented a comprehensive overview of the subject in the first paper. Other aspects of the topic reviewed include the epidemiology of drug use patterns among teen-agers; the personality and sociodemographic factors associated with drug use; the influence of family and peer group on the adolescent's drug-abusing behavior or lack thereof; the relationship between drug abuse and crime; and a review of the biomedical consequences of drug use in adolescents.

Dr. Robert Russell has summarized the salient points of the papers and the discussion in the Executive Summary. Dr. Dan Lettieri, Chief, Psychological Sciences Branch, NIDA Division of Research, directed the scientific discussion.

Jacqueline P. Ludford, M.S.
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Drug Use by Youth: An Overview

Denise B. Kandel, Ph.D.

DRUG BEHAVIOR AS SOCIAL CHANGE

The spread in the use of marijuana and other illicit drugs in the population represents one of the most striking instances of social change of the last decade. As stressed by the National Institute on Drug Abuse in a recent publication (NIDA 1980) and as discussed in the paper by Miller, the proportion of young adults 18 to 25 years of age who have ever experimented with marijuana showed dramatic increases from 4 percent in 1962 to 68 percent in 1980; the proportion who tried illicit drugs other than marijuana in that same period increased from 3 percent to 33 percent. While results from the 1977 national household survey of the general population suggested that rates of marijuana use had begun to level off, results from the most recent survey carried out in the winter of 1979-1980 indicate, on the contrary, that rates are continuing to increase both in lifetime experimentation and current use. Forty percent of young adults report using marijuana within the last month. Results from Monitoring the Future, another large-scale national epidemiological effort based on representative members of the senior high school classes throughout the country, indicate that the proportion of daily marijuana smokers among high school seniors is over 10 percent and is higher than the proportion of daily alcohol users (7 percent) (Johnston 1980a; Johnston et al 1979a,b). Furthermore, in 1979, 4 years after graduation from high school, half of the young people who were using marijuana daily while in high school were still using it that intensively, and most (66 percent) were also smoking cigarettes daily (Johnston 1980b). Use is widespread. It is probable that these figures actually underestimate the number of Americans who are involved in using drugs since rates derived from household or school-based surveys omit individuals likely to be the heaviest users, for example, school dropouts, transients, or those living in institutions such as college dormitories, prisons, or the military.

Increased prevalence of use has been accompanied by decreasing age of onset; almost twice as many high school seniors in 1979 as in 1975 (23 percent as compared to 13 percent) reported their first experience with marijuana at the eighth grade level or below (Johnston et al. 1979a,b).

Patterns of use of various drugs throughout the life cycle illustrate dramatically the age-graded nature of illicit drug use as compared with the socially accepted substances, on the one hand, and the medically prescribed drugs on the other.[1] As table 1 shows, the use of marijuana and other illicit drugs and the nonmedical use of psychoactive substances are most prevalent among individuals aged 18 to 25, with sharp declines thereafter (cf. O'Donnell et al. 1976). Age-related trends in marijuana use are the most striking. The socially accepted substances, alcohol and tobacco, are used most intensively in a wider age range than marijuana, from ages 18 to 34; although use declines thereafter, prevalence in the mid-thirties remains at a fairly high level. For the medically prescribed psychoactive substances, on the other hand, highest rates of use begin at age 26, with age of peak use varying with each of the three major classes of drugs. Use of stimulants appears to peak at ages 26 to 34, sedative use peaks after age 50, and use of tranquilizers remains at the same level from age 26 on. Thus medical use begins to peak in the years following the decline of illicit use. Since these age-related trends are based on yearly cross-sectional studies, it is not known yet whether the same persons are involved in the various patterns of use over the lifespan. Furthermore, it must be kept in mind that these age differences derived from cross-sectional studies may reflect true maturational effects as well as historical differences among cohorts with different drug experiences in adolescence. However, these comparisons of drug use patterns over the lifespan suggest that certain use of illicit drugs in adolescence and young adulthood and use of psychoactive substances under medical supervision later in the lifespan may serve similar psychological and social functions for the individual.

Because age of onset in drug use has been steadily declining into the early years of adolescence or even preadolescence, because peak use of alcohol and illicit drugs and the highest rates of increase in these rates occur when youths are entering young adulthood and must make commitments regarding family and work roles, because daily use of marijuana occurs in such a large proportion of the youth population and is more persistent than anticipated, because daily use of marijuana is associated with extensive use of other drugs, and in particular cigarettes, there is increasing concern within both the public and Government agencies about the potential health consequences. Health and Human Services Secretary Patricia Roberts Harris stresses that, "Because the emotional and physical effects of drug use have far greater consequences for a developing mind and body, it is important that we focus our efforts on the young, while continuing our efforts to provide help for all age groups" (ADAMHA News 1980, p.6). Consequences include not only changes in physiological and biomedical functioning, such as those reviewed by Dr. Sidney Cohen, but also in psychological and social functioning. Of primary concern among the psychosocial consequences in adolescence and early adulthood are the users' levels of performance in various social roles, especially schooling, work, and family. Not only level of performance, but timing is important. Indeed, the

Table 1

Current Prevalence of Various Substances in the General Population by Age and Sex in 1977
(Percentages Using--N = 4,594)[a]

				Used during past year					
Age	Used during past month			Psychoactive nonmedical			Psychoactive medically prescribed		
	Cigarettes	Alcohol	Marijuana	Stimu-lants	Seda-tives	Tran-quilizers	Stimu lants	Seda-tives	Tran-quilizers
12–13	10	13	4	—	—	—	1	3	3
14–15	22	28	15	3	2	2	1	5	8
16–17	35	52	29	8	4	7	1	6	5
18–21	51	71	31	11	10	10	3	4	10
22–25	45	70	24	11	6	6	4	8	12
26–34	47	70	12	3	2	4	6	7	18
35–49	45	61	2	—	—	1	3	8	19
50+	34	44	1	—	—	—	2	11	20
Youth (12–17 years, N = 1,272)									
Male	23	37	19	5	3	4	2	4	5
Female	22	25	13	3	2	2	1	6	6
Adult (18 years and over, N = 3,322)									
Male	47	67	30	4	3	4	2	8	12
Female	35	50	19	1	1	2	5	10	23

[a] Source: Abelson, Fishburne & Cisin (1977), and secondary analyses of data tape.

assumption of these roles at the proper time in the lifespan marks transition into adulthood and establishes the individual's psychosocial maturation.

Because drug use may pose a health hazard, particularly to young people, the Federal Government has played an important role in initiating and supporting systematic data gathering efforts on patterns of use and the behaviors of users in the population, as well as laboratory studies designed to assess the biomedical and physiological consequences of various forms of drug use on humans as well as animals. In a series of extensive clinical assessments, volunteers in a number of medical centers have been studied when using marijuana in closed wards for lengthy periods ranging from 30 to 90 days (cf. Jones and Benowitz 1976; Mendelson et al. 1974). These laboratory and field studies have increased our knowledge and understanding of various forms of behavior related to use of drugs, especially marijuana. The present papers provide extremely useful reviews of knowledge in several areas. In particular, there are summaries of the most recent epidemiological data on drug behaviors by Miller; of the correlates and antecedents of drug behavior, both in terms of the social environment created by peers and the family by Glynn; and the individual personality attributes of the users by Gersick. We also have reviews of some of the consequences of marijuana use, biomedical and physiological consequences by Cohen, on the one hand, and behavioral consequences with respect to criminality by Clayton, on the other. The important consequences on driving have also been reviewed by Cohen.

Longitudinal Drug Studies in Adolescence and Young Adulthood

I would like to complement these reviews by bringing in a systematic developmental perspective and by focusing on a particular type of study from which a great deal has been learned, the longitudinal field study. These are the field studies in which a large number of young persons in the general population are followed over time to learn what distinguishes those individuals who start using drugs from those who do not, and what happens after a certain length of time to those young people who use drugs. These studies are among the most useful since they have the potential of making it possible to disentangle causal factors and consequences in drug use, which are confounded in any research design in which data are gathered at a single point in time.

Important insights have now been generated from these studies, both the patterns of drug use, including alcohol, and psychosocial predictors and the consequences of use (for review, see Kandel 1978b, 1980a,b). It must be stated at the outset that much more is known about the psychosocial determinants than the consequences of drug use. For the most part, these longitudinal studies have been studies of adolescents based on samples of high school or college students between the ages of 12 through 21, and have focused on the use of marijuana or other illicit drugs. For selected references on these studies, see Huba et al. 1979a,b, 1980a,b, 1981; Wingard et al. 1979, 1980; Elinson 1976; Jessor et al. 1973; Jessor and Jessor 1977, 1978; Kandel 1973,1974a,b,1978c; Kandel et al. 1976a, 1978a,c; Kaplan 1977a,b, 1978a,b, 1980; Kaplan and Pokorny 1978; Mellinger et al. 1976a,b, 1978a,b; Sadava 1973; Sadava and Forsyth 1977a,b; Smith and Fogg 1978, 1979. Lukoff and Brook's followup of a ghetto teenager population is community-based (Brook et al. 1977a,b, 1978, 1980), as is Kellam's long-term followup of a cohort of black ghetto youths first contacted at age 6 (Kellam et al. 1977, 1980a,b). Lukoff and Brook are currently carrying out a new study of high school students in different ethnic communities.

To date, much greater attention has been paid to the adolescent years than to the years of early adulthood, with few longitudinal studies focusing on the transitional years from adolescence to early adulthood. Of the three completed longitudinal studies that have bridged the years between the high school and the post-high school years, two have been carried out by Johnston and his associates: (1) the followup through age 23 in 1974 of the Youth in Transition cohort (N=1,608), a nationwide representative sample of the 1966 tenth grade boys initially selected for a study of school dropouts (Johnston 1973; Johnston et al. 1978; Bachman et al. 1978; O'Malley 1980); and (2) the ongoing yearly followups of successive subsamples of national high school senior cohorts in Monitoring the Future (Johnston 1980a,b; Johnston et al. 1979a,b; Bachman 1980a). Since 1975, national representative samples of high school seniors drawn from over 130 public and private high schools have been surveyed annually. Subsamples of 2,500 cases are selected every year and are followed annually or biannually for up to 6 years. The oldest cohort will be approximately 23 years old in 1981. The most noteworthy aspect of the design is that it is cohort-sequential, with additional cohorts selected in successive years and each followed over time. This most sophisticated and rarely implemented design will make it possible to disentangle maturational, cohort, and historical effects in recorded changes over time. Finally, Brunswick's followup of Harlem youth included young men and women aged 23 to 24 (N=536) at the second interview in 1975-1976 (Brunswick 1979, 1980a,b; Brunswick and Boyle 1979). Two studies have followed up adults. Robins focused on narcotic use by Vietnam veterans. She interviewed veterans discharged in the United States in September 1971, with an oversample identified with urines positive for opiates, in 1972 at age 22 to 23 (N=571), and in 1974; and a matched comparison sample (N=284) of non-veterans in 1974 (Robins 1973, 1974, 1977, 1978; Robins et al. 1974, 1977). Cahalan and his collaborators examined alcohol problems in a national sample of adult men 18 to 65 years old (N=1,369) over a period of 8 years (Cahalan and Room 1974; Roizen et al. 1978).

In an interesting development in 1979 and 1980, four new followup studies of adolescents into young adulthood were initiated almost simultaneously. These studies share a number of similarities: they are all followups of earlier longitudinal adolescent studies, cited above, carried out in the early 1970's, and they contact the former adolescents at approximately the same age in early adulthood. Richard and Shirley Jessor are contacting by mail their original high school

(N=432) and college cohorts (N=205). Two followups are planned: the first one in 1979, 6 years after the last contact in 1972-1973, the second one 2 years later. Respondents will range in age from approximately 21 to 28 years of age. Beginning in summer 1980, Kaplan is following up 9,000 respondents who constitute 50 percent of the seventh graders enrolled in 18 junior high schools in Houston in 1971. Of these students, 7,800 were included in the first wave of data collection in 1971; the remainder were presumably absent from school on the day of the survey. Personal interviews will be carried out continuously over a 3-year period with successive units of 100 cases, when respondents will be 22 to 25 years old. Smith's study is based on a mail followup of 4,000 former eighth through tenth graders in one school in the greater Boston area, ranging in age from 22 to 28 years when contacted in 1980. In addition to documenting behavioral consequences of drug use, a major emphasis of that study will be on perceived consequences of use. Kandel is following up through personal interviews in summer and winter 1980 a representative subsample of adolescents formerly enrolled in the tenth and eleventh grades in 18 New York State public secondary schools in 1971-1972, and previously studied 8 years earlier. The target sample of 23- to 24-year-old respondents includes 1,230 adolescents who participated in the initial high school survey and a complementary group of 330 absentees from the same schools. A fifth study will be initiated late in 1980, a followup by Clayton of a subsample of the national cohort of young men aged 18 to 30 included in O'Donnell et al. 1976.

No results are yet available from these studies. Eventually, they will provide important opportunities for replication and convergence of findings of the sort provided earlier by the adolescent studies (Kandel 1978a, 1980b).

Stages in Drug Involvement

While cross-sectional studies had earlier documented the strong association that exists in the use of various substances, longitudinal studies have identified important developmental sequences in usage patterns. The use of legal drugs precedes the use of illegal ones, irrespective of the age at which initiation to illegal drugs takes place (Kandel 1975, 1980; Kandel and Faust 1975). At least four distinct development stages in adolescent drug involvement can be identified: (a) beer or wine; (b) cigarettes and/or hard liquor; (c) marijuana; and (d) other illicit drugs. The same steps are followed in regression as in progression in drug use. Similar patterns are found among black and white youths, although blacks may be more likely to proceed directly from marijuana to heroin without experimenting with pills and the psychedelics (Johnson 1973; Kleinman and Lukoff 1978; Brunswick 1979). Further evidence for the existence of stages in drug use has been provided by the findings that different sociopsychological factors predict adolescent initiation into different stages of drug use (Kandel et al. 1978a,b,c). This will be discussed in greater detail below.

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It is important to keep in mind that one's position at a particular point in the sequence is no indication of later progression to other drugs higher up in the sequence. Rather, the use of an early sequence drug is a necessary but not sufficient condition for progression to a later stage, i.e., involvement with more serious drugs.

Predictors of Drug Initiation in Adolescence

Moving beyond simple correlations that describe the characteristics of adolescent drug users at one time point, longitudinal studies have greatly increased our understanding of the predictors of drug use in the early phases of adolescent drug involvement. In particular, we know that many of the factors found to be associated with drug use at one point in time, such as low academic performance, crime, low self-esteem, depressive mood, rebelliousness, and other personality characteristics precede the use of drugs (see, in particular, Johnston et al. 1978; Jessor and Jessor 1977; Kandel et al.1976b, 1978c; Kaplan 1980; Kaplan and Pokorny 1978; Mellinger et al. 1976a,b; Smith and Fogg 1978; Wingard et al. 1979). Some of the predictive factors can be identified in childhood, such as behavior disorders (Love 1979), aggressiveness with or without association with shyness (Kellam et al. 1980a,b), and rebelliousness (Smith and Fogg 1978). Most attention has been focused on alcohol and marijuana use. At a more general level, involvement in a variety of drugs is part of a general pattern of involvement in deviant and rebellious activities (Jessor and Jessor 1977, 1978; Johnston et al. 1978; Kaplan 1977a, 1978b; Segal et al. 1979, 1980; Smith and Fogg 1978, 1979). Our own longitudinal analyses based on a sequential model of drug use have been especially helpful in isolating stage-specific predictors of initiation into various legal and illegal drugs (Kandel et al. 1978a,b,c; Margulies et al. 1977). At the earliest levels of drug involvement, adolescents who have engaged in a number of minor delinquent or deviate activities, who enjoy high levels of sociability with their peers, and who are exposed to peers and parents who drink, start to drink. The relationship with parental use of hard liquor suggests that these youths learn drinking patterns from their parents. The use of marijuana is preceded by acceptance of a cluster of beliefs and values that are favorable to marijuana use and in opposition to many standards upheld by adults, by involvement in a peer environment in which marijuana is used, and by participation in the same minor forms of deviant behaviors that precede the use of hard liquor. By comparison, use of illicit drugs other than marijuana is preceded by poor relationships with parents, by exposure to parents and peers who themselves use a variety of legal, medical, and illegal drugs, by psychological distress, by heavy involvement in marijuana, and by a series of personal characteristics somewhat more deviant than those that characterize the novice marijuana or hard liquor user. In general, prior behavior is a much stronger predictor of subsequent drug behavior than expressed intentions to use drugs. (Huba et al. 1981).

Alcohol and Illicit Drug Use in Young Adulthood

As noted above, most research has emphasized the teen years, since these are the years of initiation into drugs. The spread of illicit drug use into the early twenties as the younger cohorts have matured has brought about a surge of interest in the early years of adulthood when rates of use of most drugs reach their peak.
However, because few longitudinal studies in early adulthood have been completed, most of our knowledge about the social psychological characteristics of drug users in early adulthood is based on cross-sectional studies and is at the level of correlates. Very little is known about the consequences of use. The most important cross-sectional studies include the national survey of young men 18- to 30-years-old carried out by O'Donnell, Clayton, and their collaborators (O'Donnell and Clayton 1979; O'Donnell et al. 1976; Clayton and Voss 1977) and the analyses based on national household surveys of the general population (Cisin et al. 1976; Miller et al. 1978). A number of associations have been established, pertaining to different areas of functioning, including the educational, the occupational, the marital, the parental, and the criminal spheres.

The years of intensive use of alcohol and illicit drugs correspond to the very years in which most individuals make commitments regarding their education, occupation, and family, commitments that have long-term social and psychological consequences both for the individual and for society. Completion of education, entry into the labor force, marriage, and parenthood all take place in the early twenties.

1. Marital status. A very consistent relationship to all forms of drug use is found with marital status. Persons who are married show the lowest rates of use, while the single, the divorced, and those living independently show much higher rates (Manheimer et al. 1969; O'Donnell et al. 1976; Henley and Adams 1973; Brown et al. 1974; Robins 1974; Bachman et al. 1978). Being married is one of the most important predictors of cessation of the use of marijuana and stronger drugs among adults in national samples (Cisin et al. 1976; Hudiberg and Joe 1976).

2. Higher education. Contradictory findings have been reported on the drug use of employed youth as compared to their college-going peers. McGlothlin (1971) concluded from a review of existing studies that rates of drug use by college students were higher than those of nonstudents (see also National Commission on Marijuana and Drug Abuse 1972). On the other hand, among the Vietnam soldiers, drugs users tended to have had less education than nonusers (Robins 1974); Brunswick (1979) reports lower levels of completed education for heroin users than for nonusers, especially women. Similarly, O'Donnell et al. (1976) found lowest rates of use among college graduates. Cisin et al. (1976) found no essential differences in the use of marijuana and other illicit drugs between college graduates and those who had not gone to college.

3. Labor force participation. Findings pertaining to labor force participation are among the most consistent. The unemployed are consistently found to have the highest rates of use of most drugs, especially alcohol and illicit drugs other than marijuana (see, for example, Brunswick 1979; O'Donnell et al. 1976; Bachman et al. 1978; Robins 1974). In a national sample housewives were most likely to have stopped the use of marijuana or strong drugs, while students and those unemployed were least likely to have done so (Cisin et al. 1976).

Consequences of Drug Use in Natural Populations

As noted above, to date much more attention has been paid to the precursors than to the consequences of drug use. The evidence available to date in population surveys pertains to four areas of functioning: (1) motivation, (2) criminal activity, (3) psychological functioning, and (4) health.

1. The amotivational syndrome. It is widely feared that the use of drugs by young people may lead to the amotivational syndrome, the "loss of interest in virtually all activities other than cannabis, with resultant lethargy, amorality, and social and personal deterioration" (National Commission on Marijuana and Drug Abuse 1972, p.64). There is very little evidence to date on this issue. The available evidence suggests that, while there is an association at one point in time between indicators of the "amotivational syndrome" and drug use among college students, such states may precede the use of drugs. The association is explained away by spurious factors that are simultaneously related to those states and to drug behavior. Somewhat contradictory evidence is presented regarding adverse consequences on academic performance, clarity of occupational goals, or dropping out of school, although the conclusion appears to be that drug use per se may not lead to the observed consequences. Most of the documentation is provided by three studies: the Mellinger et al. (1976a,b, 1978a) study of male college freshmen at the University of California at Berkeley; Brill and Christie's (1974) study of undergraduates at the University of California at Los Angeles; and Johnston's (1973) followup of a national cohort of tenth grade high school boys. No differences in grade point average were observed by Brill and Christie (1974) either at one time point or over time in their sample of college students classified into six marijuana-use groups: never used, initiated, increased, remained stable, decreased, or stopped use. Other investigators, however, report that marijuana users are most likely to drop out of school (Johnston 1973; Mellinger et al. 1976a,b), to have lower grades (Kandel et al. 1976a), or to have greater difficulties in deciding on a career (Brill and Christie 1974). In a recent analysis, O'Malley (1980) reports that cigarette smoking in high school has a small effect in reducing educational attainment by age 23.

Differences in dropout rates or in indecision about career goals that appeared among drug users in their junior year at Berkeley were eliminated in multivariate analyses that took into account the students' characteristics when they entered college: family background, scholastic performance in high school, and academic values (Mellinger et al. 1976b, 1978a). Exceptions involving very small groups of students were encountered, however. The rate of dropping out of college was extremely high (53 percent) in a group (N=19) of continuing multiple drug users with low academic motivation at entrance to the University of California and with parents of low educational background. This contrasts with dropout rates varying between 11 percent and 15 percent for other students with initially low academic motivation (Mellinger et al. 1976a,b). Among another group of 22 men whose occupational goals were clear at Time 1 who remained continuous multiple drug users (marijuana and other illicit drugs) throughout the first 2-1/2 years of college, a larger proportion became undecided about their career goals. Also, an even smaller group of continuous multiple drug users (N=12) had lower grades at Time 2 than would be expected on the basis of their prior characteristics. This result, however, was not statistically significant (Mellinger et al. 1978b), and the number of students on whom these analyses are based is very small.

Similarly, O'Malley (1975) found no significant changes in self-reported grades associated with drug use in the cohort of tenth grade boys in the Youth in Transition cohort when followed for 4 years after high school. Users of hard drugs had lower educational attainments than would be expected on the basis of their predrug aspirations: The proportion aspiring to college dropped from 62 percent to 37 percent among those who began to use barbiturates or heroin, and from 76 percent to 50 percent among those who began to use hallucinogens. The reduction in college aspirations, however, tended to precede rather than to follow the initiation into illicit drugs other than marijuana (O'Malley 1975). Furthermore, the use of these illicit drugs had no effect on other motivational variables having to do with job attitudes and self-actualization. It would appear that low school performance does not lead to drug use, but that the same variables that lead to poor school performance are also related to involvement in drugs. However, cigarette use appears to lower educational level attained after high school, when controlling for social class, ability, and academic performance while in high school (O'Malley 1980).

It is important to note that to date few studies relevant to the issue have been carried out on samples of young adults. It is also possible that certain effects manifest themselves especially in early adolescence, an earlier stage of psychosocial development than has been examined to date in the studies concerned with the academic consequences of drug consumption. Furthermore, to date, studies have not isolated for special analyses those young people who use drugs, and especially marijuana, on a daily basis. Johnston and his colleagues are currently carrying out such analyses, made possible by the large number of cases available in the Monitoring the Future national cohorts (Johnston 1980b).

2. Crime. The studies on young adult men by Robins (1973, 1974) and by O'Donnell et al. (1976), as well as an earlier followup study on a sample of former high school students by Johnston et al. (1978) document a strong cross-sectional relationship between the use of marijuana or other illicit drugs and delinquency. These relationships are confirmed in the data presented by Clayton in this volume. However, the causal sequence between drug involvement and deviant activities is subject to differing interpretations. Robins (1973, 1974) reported that drug use during military service in Vietnam had a strong potentiating effect on arrest rates following return of the soldiers to the United States, even when the more frequent preservice arrest histories of the drug users were taken into account. Her conclusions regarding the causal connection between drug use and delinquency differ from those reached by Johnston et al. (1978). On the basis of their continued followup of the Youth in Transition cohort of tenth grade boys through their early twenties, Johnston et al. concluded that marijuana use and the use of other illicit drugs did not lead to an increase in delinquency over time. Differences among users in their early twenties could be accounted for by predrug use differences in the late teens. The different conclusions reached by the two groups of investigators may reflect differences in the characteristics of the cohorts, the patterns of drug use, and the social contexts involved in each of the studies. Indeed, the young veterans studied by Robins were involved in narcotics while the young men followed by Johnston and his colleagues were involved in non-narcotic drugs. Whether or not drug use by itself potentiates further criminal involvement, delinquency would appear to precede drug use, as stressed by Clayton.

3. Psychological distress. Certain forms of drug use may represent coping strategies to deal with feelings of psychological distress. Two studies have now reported findings that suggest that the use of certain drugs may help adolescents handle various forms of psychological stress such as low self-esteem or depressive mood. In a three-wave longitudinal study of junior and senior high school students, Kaplan found that a lowering of self-esteem over time predicted initiation into various deviant behaviors, including one of several forms of drug use (marijuana, drinking, or narcotics) and that adoption of one of these behaviors led to subsequent improvement in levels of self-esteem (Kaplan 1977a,b; Kaplan and Pokorny 1978). Similarly, in our own work (Paton et al. 1977), we found that over the course of a school year depressive mood predicted the onset of marijuana use among nonusers as well as the use of other illicit drugs by marijuana users. Furthermore, continued use of illicit drugs other than marijuana was associated with a decrease in levels of self-reported depressive mood over time. These results suggest that the use of

illicit drugs other than marijuana might serve a self-medicating function. Kellam et al. (1980a) reported that black youngsters who were symptomatic on scales of psychological well-being as young children were more likely than their classmates to be using alcohol in adolescence.

The use of illicit (or licit) drugs as coping mechanisms to deal with feelings of psychological distress is suggested by three other lines of inquiry. First, there are the studies carried out among adults that have shown that alcohol and psychoactive drugs are used to cope with various life stresses (Parry et al. 1974; Pearlin and Radabaugh 1976). Secondly, findings from epidemiological studies indicate that several of the social factors related to the distribution of depression or depressive mood in the general population are identical to those related to drug use, e.g., unemployment or marital separation (Comstock and Helsing 1976; Weissman and Klerman 1977; Warheit et al. 1973). Finally, clinical studies of clients in methadone treatment centers have found a high incidence of depressive symptomatology in these populations (Altamura 1975; Weissman et al. 1976, 1977; Senay 1975; Kandel 1980c). In addition, a followup of a very small clinical sample of adolescents diagnosed as psychiatrically ill indicates that a diagnosis of depression without drug abuse or alcoholism predicts good outcome (Fard et al. 1978). The implication of the study is that when depression is coupled with drug or alcohol abuse, outcome may be poor.

As is apparent from a comprehensive review of psychological factors and drug behavior (Austin and Lettieri 1976), the relationship between depression and drug use in general populations represents an almost completely unexplored area of investigation. There does not exist systematic information on the relationship of various forms of drug use to feelings of depression either in adolescence or in adulthood. Nor are there data about the long-term consequences of depressive mood and drug use in adolescence on subsequent drug involvement and depression.

4. Physiological consequences. With one exception, drug studies carried out on normal populations have not assessed respondents' health status. Brunswick's research is unique in this respect since she assessed the health of young blacks in Harlem, both in adolescence and 6 to 8 years later in young adulthood, at ages 19 to 23 (Brunswick 1979, 1980a,b). The first assessment was based on medical examinations and on subjective reports of health status and experienced symptoms in three different areas: physical, psychological, and psychophysical health. The second assessment was exclusively based on self-reports. The results indicate that the strongest effects of substance use on subjective health in this black sample appeared with respect to psychophysical symptomatology, and only for heroin use among females, and glue among males. Controlling for initial health status, black female heroin users show a decline over time in psychophysical health (i.e., headaches, emotional trouble, dizziness, or chest pain) and in major activities where no disability

existed before (Brunswick 1979, 1980a,b). There is, however, a time lag of several years before these consequences appear. No detrimental effects appeared in adolescence when these young black women first start experimenting with heroin.

5. Consequences of age at first use. Finally, most findings support the conclusion that earlier initiation into drugs, such as alcohol and marijuana, is associated with increased liability: greater subsequent abuse of that drug, greater probability of involvement in more serious drugs, lower performance in a variety of social roles, and greater involvement in deviant activities, such as selling drugs or criminality (Brunswick and Boyle 1979; Davies and Kandel 1977; Kleinman 1978; O'Donnell and Clayton 1979).

Implications: What Do We Know About the Psychosocial Determinants and Consequences of Drug Use?

Participation in drug use, especially in its more severe form, is associated with social liabilities, such as unemployment, greater marital instability, or delinquency. The causal sequence between participation in these social roles and drug use is far from clear, however. Lower social functioning found to be associated with various types of drug behavior at one point in time may in fact precede rather than follow involvement in drug use. Or, lower social functioning may also result from such use. Or, there may be interactive effects whereby drug use further exacerbates prior deviant and lower levels of functioning. The potential interactive effects between drug use and low social performance are best illustrated to date by data on criminality or involvement in deviant activities. Robins found that those veterans who had used drugs in Vietnam had highest arrest rates following return to the United States, even when the more frequent preservice arrest histories of the drug users were taken into account. Robins concluded that "the drug experience in Vietnam may have added considerably to the social liabilities of the returning veteran" (1973, p.19). Jessor et al. (1973) showed that involvement in delinquent activities by high school students, which predicted the use of marijuana, increased with continued use of the drug.

Peak use occurs in the very same years that young people are entering their young adult years and have to make commitments regarding their participation in family and work roles. As noted above, however, there exist few completed followups of young adolescents past the period of highest rates of drug use, namely the years 18 to 22, and few followups longer than 1 or 2 years in duration. Exceptions include Johnston's and Brunswick's studies. However, a number of followups of earlier adolescent cohorts into young adulthood have been initiated by Jessor, Johnston and Bachman, Kaplan, Smith, and Kandel. Clayton will also follow a subgroup of the national sample of young men into their thirties.

Much more is known about the social-psychological antecedents of initiation into drug use in adolescence than about the consequences of drug use either in adolescence or in young adulthood, or about the correlates of initiation as compared to the correlates of cessation. Much remains to be learned, not only about the long-term predictors of involvement in legal and illegal drugs, but about the psychosocial consequences of such use. Understanding the relationship between drug use and type of participation in social roles is crucial to assessing the potential consequences of drug use on psychosocial maturation in young adulthood. In the same way that parallel longitudinal studies of adolescents in the 1970's complemented one another and provided unusual and useful convergent understanding of drug behavior in adolescence, the new longitudinal studies will provide crucial and complementary understanding of drug behavior in young adulthood. Additional developments will increase the potential usefulness of these and other studies to the understanding of drug behavior. The National Institute on Drug Abuse is stimulating efforts to develop a core set of items to measure consequences of drug use. These items could be incorporated into different studies to increase comparability and replication of findings across samples (Workgroup on Consequences of Drug Use, NIDA, D. Lettieri and P. Bentler, Co-Chairmen). The large number of adolescents surveyed in the Monitoring the Future samples for the first time will make available large numbers of marijuana users for analysis. In addition, sophisticated statistical methods for the analyses of causal models newly developed in social sciences are being incorporated into drug research. Peter Bentler and the Drug Center at UCLA have taken an important leadership role in making these techniques available to drug researchers.

Although much progress has been made in our understanding of drug behavior, much remains to be learned. An important compendium of theories of drug behavior recently published (Lettieri et al. 1980), that brings together over 30 contributions from different disciplines, illuminates the narrow focus of single empirical studies. A complexity of factors will eventually have to be considered to provide a comprehensive account of the determinants and consequences of drug use. More interdisciplinary research will have to be initiated and creative ways developed to encompass both biological variables and larger contextual factors in the socio-psychological approaches that characterize much of current behavioral drug research. It will be important on the one hand to incorporate some of what has come to light regarding the role of genetic and metabolic factors in susceptibility to drug abuse. On the other hand, greater attention will also have to be paid to contextual factors and changes in society at large. For example, rarely have parallels been sought between increases in rates of drug use and concurrent changes in other areas of behavior related to lifestyles, such as sexual attitudes and experimentation, where changes have been striking (Hopkins 1977). Social factors other than those that characterize the immediate interpersonal contexts provided by family and peers, such as community or school contexts, are rarely taken into account systematically. Yet, as the work by McCoy and his associates has made clear (McCoy and Chitwood n.d.), cases of drug abuse are clustered within certain residential areas within a community. Cross-cultural comparisons indicate that persistence and intensity of involvement among users are related to the overall prevalence of use in a particular culture (Kandel et al. in press).

Another issue to be resolved concerns the specificity of factors identified as determinants or consequences of drug use. Does a unique set of factors precede each kind of substance use, or does a common set of factors precede all substances, with the specific substance used determined mainly by availability? Similarly, does a unique or a common set of consequences follow the use of various drugs? Certain investigators stress the specificity of factors. For example, Kellam and his colleagues (Kellam et al. 1980a) found that psychological symptomatology in first grade predicted alcohol use 10 years later but no other forms of drug use. Kandel and her associates (Kandel et al. 1978a,b) identified stage-specific predictors of three forms of drug involvement. On the other hand, Jessor and Jessor (1978) and Bachman et al. (1980b) emphasize the commonality in the correlates and predictors of various forms of drug behavior, and of minor delinquency. Indeed, the issue of commonality involves a broader concern than commonality among various forms of drug use. The issue must be broadened to consider the potential similarities and/or differences that underlie participation in drug use and in other nonconforming and deviant behaviors, such as delinquency and psychopathology (see comments by Clayton in this volume; Jessor and Jessor 1977; Kaplan 1980).

Much remains to be learned about the determinants and consequences of substance use by young people. The papers in this volume contribute to the emerging consensus that the understanding of adolescent drug behavior requires a developmental perspective in which drug use is considered within the comprehensive perspective of adolescent psychosocial development and socialization.

FOOTNOTE

[1] Data from the 1977 rather than 1979 general household survey are discussed because the more recent survey does not include data on medical use of psychoactive active substances (Abelson et al. 1977).

REFERENCES

Abelson, H.I., Fishburne, P.M., and Cisin, I. National Survey on Drug Abuse: 1977. Vol. I: Main Findings. National Institute on Drug Abuse. DHEW Pub. No. (ADM)78-618. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1977.

ADAMHA News. VI(14), July 11, 1980.

Altamura, A.C. Therapeutic attempts with lithium in young drug addicts. Acta Psychiatr Scand, 52:312-319, 1975.

Austin, G., and Lettieri, D., eds. Drugs and Personality, National Institute on Drug Abuse Research Issues 14. DHEW Pub. No. (ADM)76-390. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Bachman, J.G., Johnston, J.D., and O'Malley, P.M. Monitoring the Future. Questionnaire Responses from the Nation's High School Seniors 1978. Ann Arbor, MI: Institute for Social Research, University of Michigan, 1980a.

Bachman, J.G., Johnston, J.D., and O'Malley, P.M. Smoking, drinking, and drug use among American high school students: Correlates and trends, 1975-1979. University of Michigan (unpublished manuscript), 1980b.

Bachman, J.G., O'Malley, P.M., and Johnston, J. Youth in Transition Vol. VI. Asolescence to Adulthood - Change and Stability in the Lives of Young Men. Ann Arbor, MI: Institute for Social Research, University of Michigan, 1978.

Brill, N.W., and Christie, R.L. Marihuana use and psychosocial adaption. Arch Gen Psychiatry, 31:713-719, 1974.

Brook, L.S., Lukoff, I.F., and Whiteman, M. Correlates of adolescent marihuana use as related to age, sex, and ethnicity. Yale J Biol Med, 50:383-390, 1977a.

Brook, L.S., Lukoff, I.F., and Whiteman, M. Peer, family, and personality domains as related to adolescents drug behavior. Psychol Rep, 41:1095-1102, 1977b.

Brook, L.S., Lukoff, I.F., and Whiteman, M. Family socialization and adolescent personality and their association with adolescent use of marihuana. J Genet Psychol, 133:261-271, 1978.

Brook, L.S., Lukoff, I.F., and Whiteman, M. Initiation into adolescent marihuana use. J Genet Psychol, in press, 1980.

Brown, J., Glaser, D., Waxer, E., and Geis, G. Turning off: Cessation of marihuana use after college. Soc Prob, 21:527-538, 1974.

Brunswick, A.F. Black youth and drug use behavior. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse: Problems, Issues, and Treatment. Lexington, MA: Lexington Books, 1979. pp. 443-492.

Brunswick, A.F. Health stability and change: A study of urban black youth. Degree and kind of change. Am J Public Health, 70(5):504-513, 1980a.

Brunswick, A.F. Health consequences of non-medical drug use. A longitudinal study of urban black youth. In: Mednick, S.A., and Harway, M., eds. Longitudinal Research in the United States, in press, 1980b.

Brunswick, A.F., and Boyle, J.M. Patterns of drug involvement: Developmental and secular influences on age at initiation. Youth Soc, 11(2):139-162, 1979.

Cahalan, D., and Room, R. Problem Drinking Among American Men, Monograph 7. New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1974.

Cisin, I.H., Miller, J.D., and Wirtz, P.W. *Discontinuing Drug Use.* Washington, D.C.: The George Washington University Social Research Group, 1976.

Clayton, R.R., and Voss, H.L. Shaking up: Cohabitation in the 1970s. *J Marriage Fam*, 39:273-283, 1977.

Comstock, G., and Helsing, K. Symptoms of depression in two communities. *Psychol Med*, 551-563, 1976.

Davies, M., and Kandel, D. Age of Onset. Columbia University (unpublished report), 1977.

Elinson, J. Antecedents and consequences of teenage drug behavior. Paper presented at the Conference on Strategies of Longitudinal Research in Drug Use, Puerto Rico. April 1976.

Fard, K., Hudgens, R., and Welner, A. Undiagnosed psychiatric illness in adolescents. *Arch Gen Psychiatry*, 35:279-282, 1978.

Fishburne, P., Abelson, H., and Cisin, I. *The National Survey on Drug Abuse Main Findings 1979.* National Institute on Drug Abuse. DHHS Pub. No. (ADM)80-976. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

Henley, J.R., and Adams, I.D. Marihuana use in post collegiate cohorts: Correlates of use, prevalence, patterns, and factors associated with cessation. *Soc Prob*, 20:514-520, 1973.

Hopkins, J.R. Sexual behavior in adolescence. *J Soc Issues*, 33:67-85, 1977.

Huba, G.J., Wingard, J.A., and Bentler, P.M. Beginning adolescent drug use and peer and adult interaction. *J Consult Clin Psychol*, 47:265-276, 1979a.

Huba, G.J., Wingard, J.A., and Bentler, P.M. Adolescent drug use and intentions to use drugs in the future: A concurrent analysis. *J Drug Educ*, 0:145-150, 1979b.

Huba, G.J., Wingard, J.A., and Bentler, P.M. Application of a theory of drug use to prevention programs. *J Drug Educ*, 10:25-38, 1980a.

Huba, G.J., Wingard, J.A., and Bentler, P.M. Longitudinal analysis of the role of peer support, adult models in beginning adolescent substance use. *Multivariate Behav Res*, in press, 1980b.

Huba, G.J., Wingard, J.A., and Bentler, P.M. Intentions to use drugs among adolescents: A longitudinal analysis. *Int J Addict*, 16: in press, 1981.

Hudiberg, R.A., and Joe, G.W. *Behavioral Correlates and Comparisons of Current Marijuana Users, Quitters and Evasives.* Institute of Behavioral Research Report No. 76-7. Fort Worth, TX: Texas Christian University, 1976.

Jessor, R., and Jessor, S.L. *Problem Behavior and Psychosocial Development - A Longitudinal Study of Youth*. New York: Academic Press, 1977.

Jessor, R., and Jessor, S.L. Theory testing in longitudinal research on marihuana use. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978. pp. 41-71.

Jessor, R., Jessor, S.L., and Finney, J. A social psychology of marihuana use: Longitudinal studies of high school and college youth. *J Pers Soc Psychol*, 26:1-15, 1973.

Johnson, B.D. *Marijuana Users and Drug Subcultures*. New York: Wiley, 1973.

Johnston, L. *Student Drug Use*. Ann Arbor, MI: Institute for Social Research, 1973.

Johnston, L. National drug abuse trends among American youths. Paper presented at the 10th International Institute on the Prevention and Treatment of Drug Dependence, Cardiff, Wales. June 1980a.

Johnston, L. The daily marijuana user. Presented at the National Alcohol and Drug Coalition First Annual Meeting, Washington, D.C. September 18, 1980b.

Johnston, L., Bachman, J., and O'Malley, P. *Highlights From Drugs and the Class of '78: Behaviors, Attitudes, and Recent National Trends*. National Institute on Drug Abuse. DHEW Pub. No. (ADM)79-878. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979a.

Johnston, L., Bachman, J., and O'Malley, P. *1979 Highlights. Drugs and the Nation's High School Students, Five Year National Trends.* National Institute on Drug Abuse. DHEW Pub. No. (ADM)79-930. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979b.

Johnston, L., O'Malley, P., and Eveland, L. Drugs and delinquency: A search for causal connections. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978. pp. 132-156.

Jones, R.T., and Benowitz, N. The 30-day trip -- Clinical studies of cannabis tolerance and dependence. In: Braude, M.C., and Szara, S., eds. *Pharmacology of Marihuana*. New York: Raven Press, 1976. pp. 627-642.

Kandel, D. Adolescent marihuana use: Role of parents and peers. *Science*, 181:1067-1070, 1973.

Kandel, D. Inter- and intra-generational influences on adolescent marihuana use. *J Soc Issues*, 30:107-135, 1974a.

Kandel, D. Interpersonal influences on adolescent illegal drug use. In: Josephson, E., and Carroll, E., eds. *Drug Use: Epidemiological and Sociological Approaches*. Washington, D.C.: Hemisphere-Wiley, 1974b., pp. 207-240.

Kandel, D. Stages in adolescent involvement in drug use. *Science*, 190:912-914, 1975.

Kandel, D. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978a.

Kandel, D. Convergences in prospective longitudinal surveys of drug use in normal populations. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978b. pp. 3-38.

Kandel, D. Homophily, selection, and socialization in adolescent friendships. *Am J Sociol*, 84:427-436, 1978c.

Kandel, D. Drug and drinking behavior among youth. In: Coleman, J., Inkeles, A., and Smelser, N., eds. *Annual Review of Sociology, Volume 6*. Palo Alto, CA: Annual Reviews, Inc., 1980a. pp. 235-285.

Kandel, D. Another look at convergences in prospective longitudinal surveys of drug use in normal populations. In: Robins, L.N., ed. *Psychosocial Epidemiology, Volume 7: Drug Use*. Locke, B., and Slaby, A., series eds. Geneva: World Health Organization, in press, 1980b.

Kandel, D. Young women, drug use and transition to adulthood. Grant DA01931, National Institute on Drug Abuse. Unpublished observations, 1980c.

Kandel, D., and Faust, R. Sequences and stages in patterns of adolescent drug use. *Arch Gen Psychiatry*, 32:923-932, 1975.

Kandel, D., Adler, I., and Sudit, M. The epidemiology of adolescent drug use in France and in Israel. *Am J Public Health*, in press, 1980.

Kandel, D., Kessler, R., and Margulies, R. Adolescent initiation into stages of drug use: A developmental analysis. In: Kandel, D.B., ed. *Longitudinal Research in Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978a. pp. 73-99.

Kandel, D., Kessler, R., and Margulies, R. Antecedents of adolescent initiation into stages of drug use: A developmental analysis. *J Youth Adol*, 7:13-40, 1978b.

Kandel, D.B., Margulies, R.S., and Davies, M. Analytical strategies for studying transitions into developmental stages. *Sociol Educ*, 51: 162-176, 1978c.

Kandel, D., Single, E., and Kessler, R. The epidemiology of drug use among New York State high school students: Distribution, trends and change in rates of use. Am J Public Health, 66:43-53, 1976a.

Kandel, D., Treiman, D., Faust, R., and Single, E. Adolescent involvement in illicit drug use: A multiple classification analysis. Soc Forces, 55:438-458, 1976b.

Kaplan, H.B. Antecedents of deviant responses: Predicting from a general theory of deviant behavior. J Youth Adol, 6:89-101, 1977a.

Kaplan, H.B. Increase in self-rejection and continuing/discontinuing deviant response. J Youth Adol, 6:77-87, 1977b.

Kaplan, H.B. Social class, self-derogation and deviant response. Soc Psychiatry, 13:19-28, 1978a.

Kaplan, H.B. Deviant behavior and self-enhancement in adolescence. J Youth Adol, 7:253-277, 1978b.

Kaplan, H.B. Deviant Behavior in Defense of Self. New York: Academic Press, 1980.

Kaplan, H.B., and Pokorny, A.D. Alcohol use and self-enhancement among adolescents: A conditional relationship. In: Seixas, F.A., ed. Currents of Alcoholism, Volume IV: Psychiatric, Psychological, Social and Epidemiological Studies. New York: Grune & Stratton, 1978. pp. 51-75.

Kellam, S.G., Ensminger, M.E., and Turner, J. Family structure and the mental health of children, concurrent and longitudinal community-wide studies. Arch Gen Psychiatry, 34:1012-1022, 1977.

Kellam, S.G., Ensminger, M.E., and Simon, M.B. Mental health in first grade and teenage drug, alcohol and cigarette use. J Drug Alcohol Depend, May:273-304, 1980a.

Kellam, S., Simon, M., and Ensminger, M.E. Antecedents in first grade of teenage drug use and psychological well-being. A ten year community-wide prospective study. In: Ricks, D., and Dohrenwend, B., eds. Origins of Psychopathology: Research and Public Policy. Cambridge, MA: Cambridge University Press, in press, 1980b.

Kleinman, P.H. Onset of addiction: A first attempt at prediction. Int J Addict, 13:1217-1235, 1978.

Kleinman, P.H., and Lukoff, I.F. Ethnic differences in factors related to drug abuse. J Health Soc Behav, 19:190-199, 1978.

Lettieri, D.J., Sayers, M., and Pearson, H.W., eds. Theories on Drug Abuse: Selected Contemporary Perspectives. National Institute on Drug Abuse Research Monograph 30. DHHS Pub. No. (ADM)80-967. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

Love, L.R. *Relationships of Alcohol and Drug Use Patterns of Adolescents with Their Behavioral and Environmental Characteristics in Childhood.* University of California, L.A. Progress Report to National Institute on Drug Abuse, Grant No. DA01070. June 1979.

Manheimer, D.I., Mellinger, G.D., and Balter, M.B. Marihuana use among urban adults. *Science*, 166:1544-1545, 1969.

Margulies, R., Kessler, R.C., and Kandel, D. A longitudinal study of onset of drinking among high school students. *Q J Stud Alcohol*, 38: 897-912, 1977.

McCoy, C.B., and Chitwood, D. The social problem of drug abuse in ecological perspective. University of Miami, unpublished manuscript, no date.

McGlothlin, N.H. *Marihuana: An Analysis of Use, Distribution and Control.* U.S. Bureau of Narcotics and Dangerous Drugs. Washington, D.C.: U.S. Department of Justice, 1971.

Mellinger, G.D., Somers, R.H., Bazell, S., and Manheimer, D.I. Drug use, academic performance and career indecision: Longitudinal data in search of a model. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*, Washington, D.C.: Hemisphere-Wiley, 1978a. pp. 157-177.

Mellinger, G.D., Balter, M.B., Manheimer, D.I., Cisin, I.H., and Perry, H.J. Psychic distress, life crises, and use of psychotherapeutic medications. *Arch Gen Psychiatry*, 35:1045-1052, 1978b.

Mellinger, G.D., Somers, R.H., Davidson, S.T., and Manheimer, D.I. Drug use and academic attrition among university men. Proceedings of the Conference on the Social Psychology of Drug and Alcohol Abuse, Los Angeles, CA., unpublished manuscript, May 1976a.

Mellinger, G.D., Somers, R.H., Davidson, S.T., and Manheimer, D.I. The amotivational syndrome and the college student. In: Dornbush, R.L., Freedman, A.M., and Fink, M., eds. *Chronic Cannabis Use. Annals of the New York Academy of Sciences*, 282:37-55, 1976b.

Mendelson, J.H., Rossi, A.N., and Meyer, R.E., eds. *The Use of Marihuana, Psychological and Physiological Inquiries.* New York: Plenum Press, 1974.

Miller, J.D., Cisin, I., and Harrell, A. *Highlights from the National Survey on Drug Abuse: 1977.* National Institute on Drug Abuse. DHEW Pub. No. (ADM)78-620. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1978.

National Commission on Marihuana and Drug Abuse. *Marihuana: A Signal of Misunderstanding*. Appendix Volumes I and II. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1972.

National Institute on Drug Abuse. *Excerpts from the National Survey on Drug Abuse: 1979*; and *A Drug Retrospective: 1962-1980*. Rockville, MD, 1980.

O'Donnell, J., and Clayton, R. Determinants of early marijuana use. In: Beschner, G.M., and Friedman, A.S., eds. *Youth Drug Abuse*. Lexington, MA: Lexington Books, 1979. pp. 63-110.

O'Donnell, J., Voss, H.L., Clayton, R.R., Slatin, G.T., and Room, R.G. *Young Men and Drugs — A Nationwide Survey*. National Institute on Drug Abuse Research Monograph 5. DHEW Pub. No. (ADM)76-311. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

O'Malley, P.M. *Correlates and Consequences of Illicit Drug Use*. Ph.D. thesis. Department of Sociology, University of Michigan, 1975.

O'Malley, P.M. The links between smoking and educational attainment: A longitudinal analysis. Institute of Social Research, University of Michigan, unpublished manuscript, 1980.

Parry, H., Cisin, I., Balter, M., Mellinger, G., and Manheimer, D. Increased alcohol intake as a coping mechanism for psychic distress. In: Cooperstock, R., ed. *Social Aspects of the Medical Use of Psychotropic Drugs*. Ontario: Addiction Research Foundation, 1974.

Paton, S., Kessler, R., and Kandel, D. Depressive mood and illegal drug use: A longitudinal analysis. *J Genet Psychol*, 131:267-289, 1977.

Pearlin, L., and Radabaugh, C. Economic strain and the coping functions of alcohol. *Am J Sociol*, 82:652-663, 1976.

Robins, L.N. *A Follow-Up of Vietnam Drug Users*. Interim Final Report, Special Action Office Monograph, Series A, No. 1. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973.

Robins, L.N. *The Vietnam User Returns*. Final Report. Special Action Office Monograph, Series A, No. 2. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1974.

Robins, L.N. Estimating addiction rates and locating target populations: How decomposition into stages helps. In: *The Epidemiology of Heroin and Other Narcotics*. National Institute on Drug Abuse Research Monograph 16. DHEW Pub. No. (ADM)78-559. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1978. pp. 25-29.

Robins, L.N. The interaction of setting and predisposition in explaining novel behavior: Drug initiations before, in and after Vietnam. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978. pp. 179-196.

Robins, L.N., Davis, D., and Nurco, D. How permanent was Vietnam drug addiction? In: Greene, M., and Dupont, R., eds. The Epidemiology of Drug Abuse. Am J Public Health, 64(Supplement):38-43, 1974.

Robins, L.N., Davis, D.H., and Wish, E. Detecting predictors of rare events: Demographic, family and personal deviance as predictors of stages in the progression toward narcotic addiction. In: Straus, J.S., Babigian, H.M., and Roff, M., eds. The Origins and Course of Psychopathology. New York: Plenum, 1977. pp. 379-406.

Roizen, R., Cahalan, D., and Shanks, P. Spontaneous remission among untreated problem drinkers. In: Kandel, D.B., ed. Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues. Washington, D.C. Hemisphere-Wiley, 1978. pp. 197-221.

Sadava, S. Patterns of college student drug use: A longitudinal social learning study. Psychol Rep, 33:75-86, 1973.

Sadava, S.W., and Forsyth, R. Turning on, turning off and relapse: Social psychological determinants of status change in cannabis use. Int J Addict, 12:509-528, 1977a.

Sadava, S.W., and Forsyth, R. Person-environment interaction and college student drug use: A multivariate longitudinal study. Genet Psychol Monogr, 96:211-245, 1977b.

Segal, B., Huba, G.J., and Singer, J.L. Prediction of college drug use from personality and inner experience. Int J Addict, 15: in press, 1980.

Segal, B., Singer, J.L., and Huba, G.J. Drugs, Daydreaming, and Personality: A Study of College Youths. Hillside, NJ: Lawrence Erlbaum Associates, 1979.

Senay, E. Depression in drug abusers. University of Chicago, unpublished report, 1975.

Smith, G.N., and Fogg, C.P. Psychological predictors of early use, late use, and non-use of marihuana among teenage students. In: Kandel, D.B., ed. Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues. Washington, D.C.: Hemisphere-Wiley, 1978. pp. 101-113.

Smith, G.N., and Fogg, C.P. Psychological antecedents of teenage drug use. In: Simmons, R.G., ed. Research in Community and Mental Health: An Annual Compilation of Research, Volume I. Greenwich, CT: JAI Press, 1979. pp. 87-102.

Warheit, G.J., Holzer, C.E., and Schwab, D.D. An analysis of social class and racial differences in depressive symptomatology: A community study. J Health Soc Behav, 14:291-299, 1973.

Weissman, M.M., and Klerman, G.L. Sex differences and the epidemiology of depression. Arch Gen Psychiatry, 34:98-111, 1977.

Weissman, M.M., Sholomskas, D., Pottenger, M., Prusoff, B., and Locke, B. Assessing depressive symptoms in five psychiatric populations: A validation study. Am J Epidemiol, 106(3):203-214, 1977.

Weissman, M.M., Slobetz, F., Prusoff, B., Mezritz, M., and Howard, P. Clinical depression among narcotic addicts maintained on methadone in the community. Am J Psychiatry, 133:1434-1438, 1976.

Wingard, J.A., Huba, G.G., and Bentler, P.M. The relationship of personality structure to patterns of adolescent substance use. Multivariate Behav Res, 14:131-143, 1979.

Wingard, J.A., Huba, G.J., and Bentler, P.M. Longitudinal analysis of the role of peer support adult models, and peer subcultures in beginning adolescent substance use. Multivariate Behav Res, in press, 1980.

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Epidemiology of Drug Use Among Adolescents

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This review of the epidemiology of adolescent drug use focuses on typical stages of the drug use career and assesses the diversity of experience that may characterize special subgroups of youth. As shown by earlier longitudinal studies (reviewed by Kandel 1978; 1980), drug use during the adolescent years is a dynamic, multistage phenomenon which may best be understood by a conceptualization of progressive stages of involvement. The most recent data on dominant patterns of drug use in the 12 to 21 age group are provided by two series of nationwide surveys: the national survey of high school seniors (Johnston et al. 1979) and the national survey of household population aged 12 and older (Fishburne et al. 1980). Both of these surveys are cross-sectional, but because many of the data consist of retrospective drug use histories, nationwide patterns of use in 1979 can be described in terms of sequential stages of drug experience.[1]

As Kandel has noted, the study of stages of adolescent drug use does not imply "that the use of a drug causes the progression to the next level. Nor can we assume that once started adolescents will progress through the entire sequence" (Kandel et al. 1978). Rather, during the adolescent years, each stage of the drug use career represents a risk factor with regard to more serious stages of drug involvement. Epidemiologic data can specify the levels of risk associated with progression to each successive stage. Such a conceptualization at once facilitates the identification of various kinds of antecedent factors (Kandel 1978, 1980) and reveals that the progression to each stage of drug use can be predicted with reasonable accuracy by the degree of prior contact and experience with drugs as well as the age at which these earlier drug experiences occurred. The stages-of-drug-use conceptualization is also suited to the study of drug use consequences, for, as Cisin (1979) has noted, the consequences of using a particular drug are most appropriately linked to a specific level of drug experience.

Stages of drug use involve two distinct dimensions:

- An empirical hierarchy of drugs or drug classes, which in studies of the adolescent population has been examined in terms of the sequence in which the first use of various drugs occurs; and

- Various degrees of involvement with a single drug or drug class, including drug use entry, the continuation of use, the move to abusive levels of consumption, and discontinuation of use.

These two dimensions of drug use careers--progression through a hierarchy of drugs and involvement with a single substance--are conceptually distinct. Certainly, an individual could experiment with a range of substances without continuing to use any of them; alternatively, a young person could become seriously involved in the use of a single substance without trying any other drugs. However, longitudinal data have indicated that, at least in the adolescent population, the two dimensions are empirically related: Kandel and Faust (1975) found that the heavier the use of a lower-ranked drug at Time 1, the more likely it was that progression to a higher-ranked drug would occur by Time 2, 6 months later. Furthermore, those who continue to use a higher-ranked drug usually also continue to use a lower-ranked drug (Kessler et al. 1976).

Stages of drug use thus include progression from lower-ranked to higher-ranked drugs and progressive degrees of involvement with various substances; concurrent use of different drugs often occurs, for the two dimensions typically converge as a young person becomes more (or less) involved in drug use. It should be noted that one aspect of multiple drug use that has not been widely examined is the use of two or more drugs on the same occasion. Data from the study of young men and drugs (O'Donnell et al. 1976) indicate that this phenomenon deserves attention, at least insofar as alcohol and marijuana are concerned. Bunce (1977) reports that of the young men who had used alcohol on at least 10 occasions and had also used marijuana on at least 10 occasions, over 80 percent said they had used these drugs in combination. Consequences have typically been studied in terms of a single drug or drug class, but as Bunce has pointed out, different consequences may occur as a result of multiple drug use, particularly simultaneous use of two substances.

In this paper, the most recent findings on dominant patterns of adolescent drug use, which are provided by the two series of cross-sectional national surveys, will be discussed in terms of the following topic areas: (1) the sequence of first use of various drugs; (2) stages of involvement with marijuana, including the entry into marijuana use, the importance of the opportunity factor, the continuation of marijuana use, and later stages of involvement with this drug; (3) stages of involvement with stronger drugs;[2] and (4) the consequences of marijuana use. A final section addresses questions of diversity, that is, the extent to which the experience of various adolescent population groups diverges from the dominant patterns observed in the national studies.

The survey of high school seniors is conducted by the Institute for Social Research at the University of Michigan, while the survey of the household population is jointly conducted by the Social Research Group of the George Washington University and Response Analysis Corporation. Both surveys provide data on current patterns of use and past experience for a broad spectrum of substances, including marijuana/hashish, cocaine, hallucinogens such as LSD and PCP, and the nonmedical use of psychotherapeutic drugs available by prescription. The most recent survey in each series was conducted in 1979. The instruments used in the two studies have achieved a high degree of comparability; while one is administered in the schools and the other is administered in the home, the results are strikingly similar.[3]

The two sample surveys (both of which are funded by the National Institute on Drug Abuse) represent the vast majority of the total population of adolescents aged 12 to 21; however, certain population groups are, by definition, excluded from each study: The national survey of high school seniors excludes high school drop-outs, while the national survey of the household population excludes older adolescents (aged 18 to 21) who have joined the armed forces or who reside in college dorms.[4] Both surveys also exclude certain fringe groups such as youths who are institutionalized, as well as older adolescents who have transient lifestyles and lack a fixed address.

The most recent findings of the survey of high school seniors are provided in a report of Highlights of the 1979 study (Johnston et al. 1979). A comprehensive report of prevalence rates from the 1979 household survey is provided by Fishburne et al. (1980) and in separate volumes of detailed tabulations (Response Analysis 1980); a series of papers based on special analyses of the data from the household population survey is presented in a forthcoming volume (Rittenhouse); in press); and a Highlights report (Miller and Cisin 1980) summarizes
and a Highlights report (Miller and Cisin 1980) summarizes
form the basis of the discussion of dominant patterns of adolescent drug use, which is organized around the stages-of-drug-use conceptualization suggested by earlier longitudinal studies.

THE HIERARCHY OF DRUG CLASSES

Recent reports of the order in which young persons recall having first used various drugs confirm earlier results based on scalogram analysis (Single et al. 1974; Loiselle and Whitehead 1971) and those of longitudinal studies (Kandel and Faust 1975; Kandel et al. 1978). The use of alcohol and cigarettes typically precedes the first marijuana experience (Rittenhouse, unpublished). About half of those who try marijuana (and/or hashish) in the teen years eventually use stronger drugs such as cocaine and hallucinogens—although this progression is often delayed, and in many cases does not occur until young adulthood. Those who begin marijuana use at earlier ages are more likely than others to progress to the use of these stronger drugs (Harrell and Wirtz, in press).[5] When the stronger drug list is extended to include stimulants, sedatives, and tranquilizers, correlational data indicate that the proportion of older adolescent marijuana users who report experience with other illicit drugs increases to a clear majority (Johnston et al. 1979).

The first use of marijuana typically occurs prior to the senior year of high school, often between the ages of 14 and 17; by contrast, the first use of stronger drugs such as cocaine and hallucinogens is most likely to take place in late adolescence (Johnston et al. 1979; Fishburne et al. 1980). Thus, very different lifetime prevalence levels are observed for the various adolescent groups: less than 10 percent of all 12- to 13-year-olds have ever used marijuana, but the rate increases to about 30 percent for 14- and 15-year-olds, to about 50 percent for 16- and 17-year-olds, then to 60 percent for high school seniors, and to almost 70 percent for the 18 to 21 age group (Fishburne et al. 1980; Johnston et al. 1979). Similarly, less than 10 percent of all youths aged 12 to 17 have ever experimented with drugs such as cocaine and LSD, but the rate is close to one-third for 18- to 21-year-olds (Fishburne et al. 1980; Response Analysis 1980).

STAGES OF CONTACT AND INVOLVEMENT WITH MARIJUANA

Beginning Marijuana Use

The importance of opportunity as an antecedent to first marijuana use is suggested by a comparison of the opportunity and lifetime prevalence rates for various adolescent age groups shown in table 1. Clearly, during the early adolescent years, lack of opportunity represents an effective barrier to beginning drug use; the large majority of 12- and 13-year-olds have never had the chance to try marijuana, and, indeed, less than 10 percent of this age group has ever used this drug. But by the later adolescent years, opportunities to try marijuana are widespread and the majority have used it. Thus, the opportunity factor explains much--but not all--of the difference in the lifetime prevalence rates observed for various adolescent age groups. As may be deduced from table 1, the older adolescent age groups are more likely to have taken advantage of the chance to try marijuana. However, the earlier in life the first marijuana opportunity occurs, the more likely it is that the individual will eventually try the drug (Somerville and Miller, forthcoming); when this result is considered with the previously noted finding of early marijuana use as predictive of eventual progression to stronger drugs, the importance of early contact with drugs for subsequent stages of involvement seems clear.

Interestingly, few young persons in any age group take advantage of their first chance to try marijuana--even when fairly long-term acquaintance with a user precedes the first opportunity experience (Somerville and Miller, forthcoming). The usual time lapses or time lags across first acquaintance with a marijuana user, first opportunity and first use, suggest that few young persons seek out the chance to try marijuana, that many are at first hesitant to begin use, and that repeated opportunities account for the fact that the substantial majority of those youths who are exposed to marijuana opportunity eventually try the drug.

Table 1

Marijuana Opportunity and Lifetime Prevalence Rates, by Adolescent Age Groups (1979 data)[a]

	12-13 (671)	14-15 (721)	16-17 (773)	18-21 (1,016)
Percent who have the chance to try marijuana	20%	51%	69%	83%
Percent who have ever used marijuana	8%	32%	51%	69%

[a] Based on Fishburne et al. (1980) and Response Analysis (1980).

Continuing Marijuana Use

In earlier years, lack of availability may have constituted a barrier to continuing marijuana use, but this is not the case today--at least not in the older adolescent age groups. The survey of high school seniors indicates that marijuana is almost universally available: 90 percent of the respondents to this survey said that marijuana would be fairly easy or very easy for them to obtain (Johnston et al. 1979). Few young persons can be characterized as one- or two-time experimental marijuana users. While 60 percent of high school seniors report experience with marijuana, less than 10 percent say they have used it on only one or two occasions; indeed, almost one-half of the high school seniors who ever tried marijuana say they have used it 40 or more times (Johnston et al. 1979). Similarly, in the 18 to 21 age group, use on 100 or more occasions is three times as likely as one- or two-time use. Even among youths aged 12 to 17, only one-fourth of the ever-users say that their experience has been limited to one- or two-time use; a similar number have used marijuana on 100 or more occasions. More than one-half of all adolescents who ever tried this drug are current users, i.e., reported use during the month prior to interview (Johnston et al. 1979; Fishburne et al. 1980). Thus, it seems clear that once a young person tries marijuana, he or she is likely to repeat the behavior and to continue use during the adolescent years.

Tabulations showing current use rates among 18- to 25-year-olds by their recalled age at first use (Response Analysis 1980) indicate that those who began use earlier in life are more likely to be current users; thus, the earlier the age at the first use of marijuana, the more likely the young person is to continue use through the young adult years. Again, the importance of the onset of the drug use career is emphasized.

Finally, it should be noted that almost all current marijuana users are also current alcohol users; indeed, among 18- to 25-year-olds who are current users of both drugs, the number of days on which alcohol was used during the month prior to interview correlates with the number of days on which marijuana was used (Miller and Cisin 1980). Thus, continuing marijuana users are also continuing alcohol users, and the simultaneous or combined use of these substances clearly deserves investigation.

Later Stages of Involvement with Marijuana

Turning to heavier patterns of marijuana consumption, how likely is it that a young person will use this drug on a daily or near-daily basis? While no data are available on the number of youths who ever used marijuana on a daily or near-daily basis, both major surveys indicate that among current marijuana users in the adolescent age range, about one-fourth or more (depending on age) used this drug on at least 20 days or occasions during the month prior to interview: 17 percent of all youths aged 12 to 17 are past-month users and 4 percent of this entire age group reports use on at least 20 days during the month prior to interview (Miller and Cisin 1980). Johnston reports that 36.5 percent of all high school seniors are current users, and that 10.3 percent of this high school class used marijuana on 20 or more occasions during the preceding 30 days. The corresponding figures for 18- to 21-year-olds, reported by Response Analysis (1980), are 40 percent (current use) and 12 percent (daily or near-daily use).

How often do youths discontinue the use of this drug? Quitting, or discontinuation of marijuana use, appears to be an unlikely outcome--at least until the adolescent years are past. Focusing on 12- to 17-year-olds who had first used marijuana more than 6 months prior to interview and who had used the drug on more than 10 occasions, Parry and Cisin (forthcoming) found that only about 10 percent of this user group reported no use during the past 6 months. Discontinuation of use is somewhat more likely in the years that follow adolescence if the young person marries and forms a family of his/her own.

STAGES OF INVOLVEMENT WITH STRONGER DRUGS

Patterns of beginning use of stronger drugs are similar to those discussed for the entry to marijuana use: Acquaintance with a cocaine or hallucinogen user precedes the young person's first opportunity to use one of these drugs. Few take advantage of their first chance to use either of these drugs, but many eventually try one or both--although the tendency eventually to try these substances is not as strong as the tendency to use marijuana (Somerville and Miller, in press). Stronger drug opportunity typically occurs subsequent to marijuana opportunity but may precede marijuana use; nonetheless, the decision to use a stronger drug is typically delayed until after marijuana has been tried.

Once a stronger drug has been used, continued use is less likely than was the case for marijuana. While the figures vary depending on the specific drug and the specific age group in question, it is clear both that experimental one- or two-time use is a more likely outcome for stronger drugs than for marijuana, and that current use, considered as a proportion of ever use, is lower for stronger drugs than for marijuana. Yet, one-third or more of the older adolescents who have ever tried cocaine report current use; e.g., 15 percent of high school seniors have tried cocaine and 6 percent of this high school class report current use (Johnston et al. 1979). Almost all current users of stronger drugs also report current use of both marijuana (Miller and Cisin 1980) and alcohol (Response Analysis 1980).

Among current users of stronger drugs, daily or near-daily use is rare (Response Analysis 1980; Johnston et al. 1979). As Johnston notes:

> Less than 1% of the respondents report daily use of any of the illicit drugs other than marijuana. Still 0.6% report unsupervised daily use of amphetamines, and the comparable figure for cocaine and hallucinogens ...now stands at 0.2%. While very low, these figures are not inconsequential considering that 1% of each high school class represents over 30,000 individuals. (Johnston et al. 1979, p. 15)

Discontinuing use of stronger drugs has not yet been examined, in part because of the relatively small numbers of adolescent respondents who have been classifiable as continuing stronger drug users.

CONSEQUENCES OF MARIJUANA USE

Given that so many young persons not only try marijuana, but also continue the use of this drug--in some cases on a daily or near-daily basis--the consequences of marijuana use are of increasing concern. Some current survey data are available on the perceived consequences of use among 18- to 25-year-olds, i.e., older adolescents and young adults. These data are limited to two selected consequence areas: impaired driving ability and the loss of motivation. Reports of experience with these adverse effects of marijuana are most likely among young adults who have used the drug on 100 or more occasions: 50 percent of these most experienced users say they performed less well when driving "shortly after getting really high," and 30 percent reported that at one time they "stopped caring and didn't try as hard" because of steady or daily use (Miller and Cisin 1980).

While these data do indicate that large numbers of young persons may be at risk for negative consequences of drug use, they are limited in a number of ways. This is particularly evident for the data on the amotivational syndrome, since the defining phrase, "stopped caring and didn't try as hard," was not further specified as to duration or severity of motivation loss, nor as to the perceived seriousness or ramifications of the experience. Nonetheless, it seems clear that respondents are willing to admit that they have experienced negative outcomes of marijuana use, and further investigations along these lines would seem justified.

The dominant patterns of drug use among adolescents today may be summarized as follows: Alcohol use precedes marijuana use, which, in turn, is a prerequisite for stronger drug use. As children progress through the teen years, they are increasingly likely to experience opportunities to use marijuana. Though teenagers are at first hesitant to use the drug, the majority of those who have the chance eventually do try it. Once marijuana has been tried, there is a strong tendency to continue the use of this drug (as well as alcohol) throughout the adolescent years. By the senior year of high school 60 percent have tried marijuana and 37 percent report current use; more than one-fourth of these current users (10 percent of the entire senior class) say they consume the drug on a daily or near-daily basis. By the late teens and early twenties, about half of those who began with marijuana have gone on to use stronger drugs such as cocaine and hallucinogens. The continuing user of marijuana and the stronger drug experimenter or occasional user is likely to be a young person whose first contact with marijuana occurred at an early age. Many of the older adolescents who have had extensive experience with marijuana report adverse effects of use, but an assessment of the seriousness of these consequences must await more careful definition of items in future studies. These represent the dominant patterns for the adolescent population as a whole. But important questions remain regarding the extent of diversity that may characterize the drug use experience of adolescents in various cultural groups and in different geographic locations.

DIVERSITY OF EXPERIENCE

The broad view of variation in drug use experience that the national studies provide indicates an increasing homogeneity across major demographic groups in the adolescent population. Young white and nonwhite respondents now report similar levels of marijuana experience (Fishburne et al. 1980) and the earlier study of young men and drugs also showed similar levels of drug experience for the younger cohorts of black and white males (O'Donnell et al. 1976). Trend analyses indicate that the predictive power of several other demographic variables has also diminished in the past decade; for example, rural drug use rates are now catching up with national prevalence levels (see Harrell and Cisin, 1981, for a special report on rural drug use). And while prevalence levels are lower in some regions than in others, the differences are not particularly striking (Miller and Cisin 1980; Johnston et al. 1979).

Despite the dominant picture of relative homogeneity that the nationwide surveys suggest, there is evidence of considerable diversity, including the potential for numerous pockets of drug abuse. The national surveys indicate that boys are still more likely than girls to be more heavily involved in substance use (Johnston et al. 1979; Miller and Cisin 1980), and that older adolescents (and young adults) who have left the parental home to live with friends or roommates are characterized by extremely high prevalence rates. For example, 90 percent of this group have tried marijuana and 65 percent are current users (Miller and Cisin 1980). Furthermore, as noted in the most recent Marijuana and Health report:

> Nationwide statistics may obscure considerable local variation. For example, in Maryland and Maine, where drug surveys were conducted in 1978, higher levels of daily or near-daily use of marijuana were found than among high school seniors nationwide (10.7 percent of seniors nationally). In Maryland, use "daily or several times a week" was reported by a quarter (25.3 percent) of the twelfth graders....In Maine nearly one in six high school students reported daily marijuana use....(National Institute on Drug Abuse 1980, p. 5; see also State of Maine 1979; Maryland Department of Health and Mental Hygiene 1979).

Considerable diversity may also characterize various cultural and minority groups; for instance, Kandel's study of New York high school students indicated high drug use rates for American Indian youths and low rates for Asian-American children (Kandel et al. 1976). But, while a good deal of information appears to exist on drug use by members of minority groups (Austin et al. 1978), current knowledge falls short of adequate epidemiologic description. Neither nationwide surveys of general population groups nor small studies conducted at the neighborhood or community level can adequately describe the experience of minority groups that, although relatively small in comparison to the total population, may be marked by internal cultural diversity.

A major research effort has recently been directed toward one such group. In 1977, 3,000 Native American adolescents from several tribes located in different regions of the country were surveyed by Oetting and Goldstein (1978a,b).[6] This large-scale study revealed considerable diversity across the various tribes and also showed that, as a whole, Native American children are characterized by prevalence rates that are substantially higher than those reported in national studies, for alcohol, marijuana, various stronger drugs, and particularly inhalants. In addition to presenting lifetime and current use prevalence data, the investigators report the prevalence of various types of drug use patterns. These data suggest that among Native American youths, stages of experimentation and involvement are similar to the dominant patterns observed at the national level; the primary difference seems to be that at each stage Indian children are at higher risk of progressing to further drug involvement.

In sum, an increasing homogeneity characterizes the experience of major adolescent population groups; dominant patterns described in detail by national surveys indicate the importance of the earliest drug experiences and document high levels of risk for the typical young person today. But even higher risks obtain for certain identifiable population groups. Some pockets of drug abuse can be identified in nationwide research efforts; for instance, the exceedingly high prevalence levels observed for older adolescents who have substituted peer-group living for the daily influence of family life. However, the full extent of diversity cannot be portrayed by studies with a national focus. Statewide surveys and the study of Native

American youths indicate that fairly large-scale studies directed at smaller populations are necessary to uncover concentrations of drug use in certain adolescent populations.

Finally, the adolescent groups that are by definition excluded from the national survey frames deserve special concern, since there is reason to believe that high school drop-outs, young members of the armed forces, and residents of college dormitories may be characterized by higher levels of involvement with drugs than their same-age peers who are routinely surveyed.

FUTURE RESEARCH DIRECTIONS

The surveillance function of epidemiologic research continues to be well served by national studies that describe risk factors for the majority of the adolescent population. Given the wealth of data that has now been amassed by the two series of nationwide studies, important questions concern future research directions. Certainly, large populations that are ordinarily excluded from national survey frames deserve separate study. Two other research directions should also be considered: First, data that already exist could be further mined to increase our knowledge of drug use in.certain population groups. For instance, each year the survey of the household population includes a relatively small number of high school drop-outs; by pooling data across recent survey years, it would be possible to obtain reasonably reliable information on this under-studied population group. Second, in planning future national studies, it might be advisable each year to select a special alternative population group for oversampling sufficient to allow separate analysis and to identify pockets of drug abuse that deserve further investigation in specially designed research efforts.

Thus, the mass of data that has been gathered in successive waves by the two national surveys should be subjected to further analysis, and future waves of such studies can be made more sensitive to detecting pockets of drug abuse in special adolescent population groups. In considering separate studies of special groups, priority should be given to those groups of young persons who are by definition excluded from the national surveys--and for whom we have almost no data at the present time.

FOOTNOTES

[1] This review covers general epidemiology and is based on survey research. Information on treated prevalence and officially identified cases is provided by two information systems maintained by the National Institute on Drug Abuse: CODAP (the Client Oriented Data Acquisition Process) and DAWN (the Drug Abuse Warning Network). See National Institute on Drug Abuse, 1979a,b.

[2] Because of the small numbers of adolescent survey respondents who report heroin use (e.g., 1.1 percent of high school seniors say they have tried heroin and 0.2 percent report past-month use; Johnston et al. 1979), the discussion of stronger drug use will omit specific reference to heroin.

[3] Methods of sampling and response rates are described by Fishburne et al. (1980) and Johnston et al. (1979). Briefly, the national survey of the household population is based on a stratified random sample selected in several stages, including selection of 111 primary geographic areas, 500 smaller areas, specific households, and random selection of respondents from within designated households; the response rate for 12- to 17-year-olds was 86 percent, while the response rate for 18- to 25-year-olds was 84 percent. Overall, 2,165 youths aged 12 to 17 participated in the 1979 study, as did 1,016 18- to 21-year-olds (Fishburne et al. 1980). About 125 to 130 public and private schools participate in the national survey of high school seniors. Normally, between 66 and 88 percent of the schools originally designated agree to participate; for each refusal, a similar, replacement school is recruited. About 80 percent of all sampled students complete the questionnaire, with absences from class being the chief reason for nonresponse. Altogether, 15,500 high school seniors completed the 1979 questionnaire (Johnston et al. 1979).

[4] In recent years, between 15 and 20 percent of each age cohort has dropped out of high school before graduation (Johnston et al. 1979); and, of those who completed the senior year in 1972, about 80 percent were living in households 2-1/2 years later, i.e., in the fall of 1974, while about 15 percent were residing in college dormitories or fraternity/sorority houses, and about 3 percent resided in military accommodations (Peng and Holt 1977). These figures are provided to give the reader a rough idea of the size of the excluded groups.

A worldwide survey of alcohol and drug abuse among members of the armed forces has recently been carried out by Burt Associates under the sponsorship of the Department of Defense; results have not yet been made available by DOD. While a number of surveys of college students were conducted circa 1970 (e.g., Groves 1974), these have not been recently replicated.

[5] Whether cocaine use precedes hallucinogen use or vice versa appears to depend on the historical time when the young person's move from marijuana to one of these stronger drugs occurred. In earlier years, hallucinogens apparently preceded cocaine, but in recent years, cocaine is increasingly used prior to a hallucinogen.

[6] The authors note, "Since the sample is fortuitous rather than specifically planned to represent all adolescents living on reservations, any comparisons should be treated with caution. The age balance, however, is fairly close to that of the most recent national survey, and the geographic distribution is quite wide. The results are, at a minimum, suggestive of a severe drug use problem for this minority group." (Oetting and Goldstein 1978a, p. 11)

REFERENCES

Austin, G.A., Johnson, B.D., Carroll, E.E., and Lettieri, D.J., eds. Drugs and Minorities, National Institute on Drug Abuse Research Issues 21. DHHS Pub. No. (ADM)78-507. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1978.

Bunce, R. Use of drug combinations involving alcohol. Paper prepared for the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism. Berkeley, California: Social Research Group, School of Public Health, UC-Berkeley, 1977.

Cisin, I.H. Critique. In: Rittenhouse, J.D., ed. Consequences of Alcohol and Marijuana Use. National Institute on Drug Abuse. DHHS Pub. No. (ADM)80-920. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979. pp. 207-211.

Fishburne, P.M., Abelson, H.I., and Cisin, I.H. National Survey on Drug Abuse: Main Findings 1979. National Institute on Drug Abuse. DHHS Pub. No. (ADM) 80-976. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

Groves, W.E. Patterns of college student drug use and lifestyles. In: Josephson, E., and Carroll, E., eds. Drug Use: Epidemiological and Sociological Approaches. Washington, D.C.: Hemisphere Pub. Corp., 1974.

Harrell, A.V., and Cisin, I.H. Drug Abuse in Rural America. National Institute on Drug Abuse. DHHS Pub. No. (ADM)81-1050. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1981.

Harrell, A.V., and Wirtz, P.W. Developmental sequences of illicit drug use. In: Rittenhouse, J.D., ed. National Survey on Drug Abuse During the Seventies: A Social Analysis. Rockville, Maryland: National Institute on Drug Abuse, forthcoming.

Johnston, L.D., Bachman, J.G., and O'Malley, P.M. 1979 Highlights: Drugs and the Nation's High School Students, Five Year Trends. National Institute on Drug Abuse. DHHS Pub. No. (ADM)79-930. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979.

Kandel, D.B. Convergences in prospective longitudinal surveys of drug use in normal populations. In: Kandel, D.B., ed. Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues. Washington, D.C.: Hemisphere Press-John Wiley, 1978.

Kandel, D.B. Drug and drinking behavior among youth. In: Coleman, J., Ikeles, A., and Smelser, N., eds. Annual Review of Sociology. Vol. 6. 1980. pp. 235-285.

Kandel, D.B., and Faust, R. Sequences and stages in patterns of adolescent drug use. Arch Gen Psychiatry, 32:923-932, 1975.

Kandel, D.B., Kessler, R.C., and Margulies, R. Adolescent initiation into stages of drug use: A developmental analysis. In: Kandel, D.B., ed. *Longitudinal Research in Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-Wiley, 1978. pp. 73-99.

Kandel, D.B., Single, E., and Kessler, R.C. Epidemiology of drug use among New York State high school students: Distribution, trends, and change in rates of use. *Am J Public Health*, 66:43-53, 1976.

Kessler, R.C., Paton, S.M., and Kandel, D.B. Reconciling unidimensional and multidimensional models of patterns of drug use. *J Stud Alcohol*, 37(5):632-647, 1976.

Loiselle, P., and Whitehead, P.C. Scaling drug use. An examination of popular wisdom. *Can J Behav Sci*, 3:347-356, 1971.

Maryland Department of Health and Mental Hygiene, Drug Abuse Administration. *1978 Survey of Drug Abuse Among Adolescents—General Report*. Annapolis, MD: March 1979.

Miller, J.D., and Cisin, I.H. *Highlights from the National Survey on Drug Abuse: 1979*. National Institute on Drug Abuse. DHHS Pub. No. (ADM)80-1032. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

National Institute on Drug Abuse. *Marijuana and Health* Eighth Annual Report to the U.S. Congress. DHHS Pub. No. (ADM)80-945. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

National Institute on Drug Abuse. *Data from the Drug Abuse Warning Network (DAWN)*, Quarterly Report, January-March, 1979. Statistical Series G, No. 1. DHHS Pub. No. (ADM)80-913. Rockville, Maryland: National Institute on Drug Abuse, 1979a.

National Institute on Drug Abuse. *Data from the Client Oriented Data Acquisition Process (CODAP)*. Statistical Series D, No. 13, October-December, 1979. DHHS Pub. No. (ADM)80-906. Rockville, Maryland: National Institute on Drug Abuse, 1979b.

O'Donnell, J.A., Voss, H.L., Clayton, R.R., Slatin, G.T., and Room, R.G. *Young Men and Drugs—A Nationwide Survey*, National Institute on Drug Abuse Research Monograph 5. DHHS Pub. No. (ADM)76-311. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Oetting, E.R., and Goldstein, G.S. *Native American Drug Use*. Ft. Collins, Colorado: Western Behavioral Studies, Department of Psychology, Colorado State University, 1978a.

Oetting, E.R., and Goldstein, G.S. Sample report to tribes. *Native American Drug Use*, Appendix A. Ft. Collins, Colorado: Western Behavioral Studies, Department of Psychology, Colorado State University, 1978b.

Parry, H.J., and Cisin, I.H. Discontinuing marijuana use. In: Rittenhouse, J.D., ed. National Survey on Drug Abuse During the Seventies: A Social Analysis. Rockville, Maryland: National Institute on Drug Abuse, forthcoming.

Peng, S.S., and Holt, M.M. National Longitudinal Study: Tabulation Summary of the Second Follow-Up Questionnaire Data, 2-1/2 Years After High School, Vol. 1. Washington, D.C.: National Center for Educational Statistics, 1977.

Response Analysis. Detailed Tabulations of the 1979 National Survey on Drug Abuse. Princeton, NJ: Response Analysis Corporation, 1980.

Rittenhouse, J.D. Learning drug use: From legal substances to marijuana and beyond. Paper presented at the American Psychological Association Annual Convention, Montreal, September 1980, unpublished.

Rittenhouse, J.D., ed. National Survey on Drug Abuse During the Seventies: A Social Analysis. Rockville, Maryland: National Institute on Drug Abuse, forthcoming.

Single, E., Kandel, D., and Faust, R. Patterns of multiple drug use in high school. J Health Soc Behav, 15(4):344-357, 1974.

State of Maine, Department of Human Services, Office of Alcoholism and Drug Abuse Prevention. An Evaluation of the Decriminalization of Marijuana in Maine. January 1979.

Somerville, S.N., and Miller, J.D. Opportunity and decision: An analysis of drug use entry. In: Rittenhouse, J.D., ed. National Survey on Drug Abuse During the Seventies: A Social Analysis. Rockville, Maryland: National Institute on Drug Abuse, forthcoming.

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Personality and Sociodemographic Factors in Adolescent Drug Use

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Various theories on adolescent drug abuse have moved in and out of favor over the past 30 years as society's perspectives on youth and human behavior in general have varied. This paper reviews recent work in two areas that at different times have generated large amounts of research interest: sociodemographic and personality correlates of drug use in adolescence. Each of these areas has been characterized by a consensus in earlier work on variables deserving attention, and by a need to rethink many earlier findings in light of new findings on changing drug use patterns in recent years. This paper will discuss a selection of representative studies that illustrates the most commonly investigated variables, and will suggest some new directions that deserve special emphasis. In addition the paper will highlight some implications of work in these areas for prevention efforts.

PERSONALITY FACTORS

Personality research has had a long and uneven history in relation to adolescent drug abuse. The search for drug-using types, more common in research done before the late 1960's (summarized in Sadava 1975), gave way to cross-sectional studies of correlations between drug use frequency and scores on standardized personality inventories. These studies vary in the degree to which they control for multiple levels of drug use, demographic variables, and general sociocultural factors. While some consistent tendencies have emerged, contradictory results have been very common, and the percentage of variance explained by the measured personality variables has characteristically been disappointingly low.

Psychoanalytic and depth-psychological theorists have continued to offer psychodynamic models for drug use, including deficits in ego functioning (Arnini et al. 1976; Naditch 1976), guilt mechanisms (Evans et al. 1978), oral-dependent personality structures (Zinberg 1975), and defense mechanisms (Zimmering et al. 1952). However, most of the recent work has broadened the scope of psychoanalytic explorations to include more general developmental issues (Greenspan 1977), and to emphasize the need to consider social factors along with psychodynamic factors (Blaine and Julius 1977; Chein et al. 1964).

Some writers, including Zinberg (1975), have gone so far as to argue that there has been too much emphasis on personality in the face of contradictory evidence, and the focus should shift to what psychodynamics have to add to social dynamics.

Certain personality characteristics have consistently received attention from researchers across orientations and methods. These are discussed below.

Conformity to Societal Values

The single personality dimension that has emerged most often from research in the past decade has been the orientation characterized as conformity to societal values, traditionality, or, conversely, rebelliousness (Cunningham et al. 1974; Goldstein and Sappington 1977; Simon 1974; Loper et al. 1973; Hogan et al. 1970; Smith and Fogg 1978; Green 1979). Increased drug use or earlier onset of drug use has been found to be correlated with nonconformity to traditional values (Gorsuch and Butler 1976; Kay et al. 1978; Weckowicz and Janssen 1973; Jessor and Jessor 1977; Knecht et al. 1972); lack of support for traditional social structures (Knight et al. 1974); high tolerance of deviance (Brook et al. 1977; Jessor 1976; Jessor and Jessor 1975); high resistance to traditional authority (Goldstein and Sappington 1977); and high need for independence or autonomy (Simon 1974; Jessor 1976; Segal 1976, 1977; Simon et al. 1974).

In addition, other variables indicating a lack of commitment to traditional norms and institutions have been found to be related to drug use. Knight et al. (1974) found that adolescents scoring high on drug use items were also high on social alienation but not on personal alienation, and Paton and Kandel (1978) report high normlessness in this group. More liberal or radical political orientation has been found to correlate with drug use behavior of high school students (Kohn and Annis 1978; Krug and Henry 1976). For variables such as these in particular, part of the variability in results appears to be related to the age of the subject sample. Studies on junior high and high school-age youth find more emphasis on rebelliousness, deviance, and rejection of traditional authority (Spevack and Pihl 1976; Smith and Fogg 1978), while studies of college-age youth focus more on independence (Cunningham et al. 1974).

Self-Esteem

Low self-esteem was one of the first and most consistently suggested personality correlates of drug use (Steffenhagen 1977). However, cross-sectional studies characteristically find weak or partial correlations between lower self-esteem and various categories of drug use (Ferguson et al. 1977; Ahlgren and Norem-Hebeisen 1979; Norem-Hebeisen 1976). Longitudinal studies show mixed results on the value of self-esteem as a predictor of subsequent drug use (Paton and Kandel 1978; Jessor and Jessor 1978; Smith and Fogg 1978; Kandel 1978a,b). Kaplan (1977, 1978) has published some of the most recent work in this area, investigating the relationships among sociodemographic and self-concept variables in relation to deviant behavior.

Aside from these studies, there has been surprisingly little research published in the last 6 years that directly assesses the predictive or correlative power of self-esteem on adolescent drug use. One affective measure that may be related, depressive mood, has been consistently found to be an important variable in Paton and Kandel's longitudinal work (Paton et al. 1977; Paton and Kandel 1978).

Locus of Control

This variable was also hypothesized as a key discriminator of drug use, and is still defended as a useful construct despite much nonsupportive literature (Plumb et al. 1976). There has been some evidence of a relationship between external control and drug use, but recent research has shown weak and conflicting results (Carman 1977; Brook et al. 1977; Smithyman et al. 1974; Jessor and Jessor 1977).

Sensation-Seeking

There has been some consistency in finding higher sensation-seeking and need for stimulation in drug users (Gorsuch and Butler 1976; Segal 1976). Recent studies find associations between sensation-seeking and other variables such as alcohol use (Schwarz et al. 1978) and positive attitudes toward marijuana use (Kohn and Annis 1978). This construct has suffered in particular from poor operationalization and weak construct definition and has been given less attention in research in recent years.

Psychopathology

The preponderance of correlational studies has failed to find evidence of gross pathology in samples of drug users as compared to nonusers (Stokes 1974; Davis 1977-1978; Naditch 1976). Loper et al. found no identifiable pathology in MMPI scores of college freshmen who later became alcoholics (1973). Work with younger students has been more mixed, with some indications of pathology correlating with illegal drug abuse (Anhalt and Klein 1976). Studies of precursors to heroin use show a tendency for more pathological or deviant behavior patterns (Crawford 1978), but few studies address this issue with the kind of samples that support generalization.

In recent years, most research on personality factors in adolescent drug use has focused on marijuana users, drawing primarily from college-age samples. The results of this work have often presented a dilemma to the researchers. Overall, the findings of research in the last 6 to 10 years have begun to present a different picture of the personality characteristics of marijuana users than had been assumed in much of the earlier writing. Hogan et al. (1970) described frequent users as "...characterized by high scores on Capacity for Status, Social Presence, and Flexibility. Such persons tend to be self-confident, socially poised, skilled in interpersonal relations, and possess a wide range of interests. On the other hand, they also tend toward narcissism, self-aggrandizement, and overconcern with personal pleasure and diversion" (p. 61). While not ideal, both aspects of that description fit well the mainstream personality style reflected continually in the media and commerce of our culture. Other researchers report marijuana-user profiles such as flexible, independent, and open to new experiences (Segal 1977); intellectually more effective, trusting, confident, and with greater ego strengths (Green and Haymes 1973); socially skillful, adventurous, impulsive, and resistant to authority (Goldstein and Sappington 1977); scoring higher on cognitive development, asthetic sensitivity, and high on consideration (Weckowicz and Janssen 1973); high on developmental maturity (Jessor and Jessor 1978); spontaneous and adventurous (Kay et al. 1978); and with evidence of lower distress (Ginsberg and Greenley 1978). At the same time nonusers, in some cases "principled" or "adamant" nonusers, are described as higher on responsibility and lower on ascendancy (Gulas and King 1976); higher on deference, order, and endurance (Simon et al. 1974); submissive, lacking self-insight, dependent on external structure, judgmental (Green and Haymes 1973); and less skilled, reserved, compliant, compulsive, and better adjusted (Goldstein and Sappington 1977).

These are not the only points of view. Braucht et al. (1973), summarizing results from research primarily conducted earlier in the 1960's, found conflicting data concerning marijuana use, and a generally negative set of personality characteristics correlated with alcohol and narcotic use. They conclude that "The widespread use of unrepresentative, uncontrolled subject samples and small-sample observational data make it difficult to delineate the salient personality correlates of adolescent drug use" (p. 102). Longitudinal studies focusing on prediction of onset of drug use also showed mixed results. Smith and Fogg (1978) present an impressive array of negative personality variables predicting drug use. Other studies, including Jessor and Jessor (1978), Ginsberg and Greenley (1978), and Kandel et al. (1978) do not find important negative personality predictors.

The most reasonable conclusion appears to be that for college-age samples at least, prevalence of marijuana use has become so widespread that negative personality correlates differentiating users from nonusers are no longer found (Gorsuch and Butler 1976; McCann et al. 1977; Green and Haymes 1973). For younger adolescents, the pattern may be different. Especially for very early marijuana and other illicit drug users, personality variables may still arise as important differentiators in the early teens between those who seek out the earliest possible drug use experience and those who defer it.

In summary concerning the personality variables: Data on personality factors in adolescent drug use are considerably more equivocal than is generally acknowledged. Cross-sectional studies have not reached a high degree of consensus on significant effects of personality factors beyond a general rebelliousness/conformity-to-traditional-values dimension, and it is not clear in what ways the results on this factor represent maladjustment. Concerning marijuana, researchers argue that normative behavior among the college-age population has shifted from nonuse or experimentation to moderate use. In particular, many correlational studies reflect this shift, as personality variables demonstrate a weakening ability to discriminate marijuana-using subgroups. There remains only limited data with which to update our understanding of personality correlates as predictors for use of most other drugs, including alcohol, barbiturates, the hallucinogens, and the opiates.

SOCIODEMOGRAPHIC FACTORS

In recent research, sociodemographic factors are rarely the central variables of interest. Current findings on the relationship between demographic variables and adolescent drug use come either from epidemiological survey efforts (Beschner and Friedman 1979; Dunnette, n.d.; Miller 1976), or as control variables in cross-sectional and longitudinal studies. Overall, the past decade has witnessed some improvement in the methodology and specification of sociodemographic research, but there has been only mixed success at integrating demographic results into useful theoretical frameworks.

Recent sociodemographic findings are discussed in the following sections.

Age

It has been generally found that experimentation with licit and illicit drugs begins at or near the early teens, peaks differentially for different drugs throughout the teen years, and begins to recede by the mid 20's (Sorosiak et al. 1976; Carlisi 1979; Curtis and Simpson 1977; Green 1979; Kandel 1978a,b). There is some evidence that the age of onset for marijuana use overall is decreasing (Kaplan et al. 1978); on the other hand, McCoy et al. (1979) found that the age at initial use of heroin was increasing. Freeman and Freeman (1977) found that awareness of drugs and drug terms occurs early in elementary school.

Sex

Recent work presents evidence that sex differences in the prevalence of adolescent drug use in general are disappearing or have already disappeared (Tolone and Dermott 1975; Galchus and Galchus 1977-1978; Kirk 1979; Hanson 1977; Becker 1977; Eichberg and Bentler 1976). Other studies, especially those focusing on drugs other than marijuana, have found differential patterns and sequences of drug use "careers" for males and females (Brunswick 1979). In general the studies that have found different patterns have identified a more psychodynamic, family-oriented, and interpersonal style for females in contrast to a more subcultural, deviance-oriented etiology for males (Miller 1976; Klinge et al. 1976; Margulies et al. 1977; Beschner and Treasure 1979). However, most researchers now argue that for intervention purposes, the gender differences are too small and subtle to justify differential interpretations or program design.

Socioeconomic Status

The traditional view that marijuana users come from higher socioeconomic backgrounds (Cunningham et al. 1974; Eichberg and Bentler 1975), has received less support in the most recent studies (Green 1979). Spevack and Pihl, in their review (1976), report about equal numbers of studies confirming and repudiating associations of drug use with residence SES and parental occupation, for both high school and college samples. While most often appearing in interaction effects with other variables, socioeconomic status when standing alone has not been demonstrated as a powerful correlate or predictor of drug use (Dembo et al. 1979, 1980; Kandel et al. 1978).

Religion

Two separate factors have commonly been assessed in relation to religion and drug use: denominational affiliation, and degree of religiosity. Some studies have found that adolescents who identify themselves as members of more fundamentalist religions tend to be underrepresented among drug users (Schlegel and Sanborn 1979), although not uniformly so (Rathus et al. 1976). One denominational effect that is specifically mentioned is that Jewish college students show the highest prevalence of alcohol use but the lowest rate of heavy drinking (Wechsler and McFadden 1979), interpreted as a result of that religion's prescriptive rather than proscriptive norms on alcohol (Braucht et al. 1973).

The more common variable reflecting religion in recent years, and the construct providing stronger effects, has been religiosity. Higher scores on religiosity scales or items such as frequency of church attendance have been consistently correlated with lower incidence of drug use (Gorsuch and Butler 1976; Margulies et al. 1977; Jessor 1976; Schlegel and Sanborn 1979; Murty 1979; Wechsler and McFadden 1979).

Level of Academic Achievement

While not a demographic variable in the same way as the other categorical constructs, academic achievement has been studied frequently as a predictor, correlate, and outcome of adolescent drug use. Overall findings are inconsistent; some studies find lower levels of school achievement (usually grade point average) associated with marijuana use (Simon 1974; Anhalt and Klein 1976; Jessor 1976), while others find no relationship (McCann et al. 1977; Miranne 1979; Simon et al. 1974). An important factor in the discrepancy seems to be age of the sample. Most of the positive findings come from junior high school populations, while nonsignificant findings come from college populations (Cohen and Santo 1979). Research on opiate use is less common on this variable because of the heavy reliance on treatment samples rather than school samples. There is some evidence that heroin use is associated with disruptive school behavior (Rathus et al. 1976), or severe underachievement (Zimmering et al. 1952).

Race and Ethnicity

Research in this area has evolved over the past two decades from a focus on primarily white/nonwhite distinctions to more complex breakdowns of ethnicity and more differentiated data on subcultural patterns, although many aspects of drug use among minority racial groups remain infrequently studied (Harper and Dawkins 1976). Many of the recent studies on marijuana and alcohol use in college samples have not found significant differences in use patterns among racial groups (Galchus and Galchus 1977-1978; Poulsen et al. 1978). Dembo et al. (1979) did not find main effects for ethnic group in their urban junior high sample, although there were interaction effects with home environment variables. Concerning other drugs, most recent researchers have found overrepresentation of black, Hispanic, and Native American subsamples among users of drugs other than marijuana (Galchus and Galchus 1977-1978; Curtis and Simpson 1977; Padilla et al. 1979; Iiyama et al. 1976). Studies that include Asian Americans typically find them underrepresented in most categories (Wechsler and McFadden 1979). There has been some recent work focusing on Native American populations, once again generally showing overrepresentation in most use categories (Cockerham 1977; Oetting and Goldstein 1979). Race and ethnicity frequently show interaction effects with other sociodemographic variables, such as sex (Szapocnik et al. 1979), and sociocultural variables, such as relationship with peers (Kleinman and Lukoff 1978). Some recent formulations support a somewhat different pattern of drug use development for black and Hispanic youth (alcohol to marijuana to heroin and cocaine) than for most white ethnic groups (alcohol to marijuana to psychedelics and barbiturates to cocaine and heroin) (Brunswick 1979; Kandel 1978a,b). Iiyama et al. (1976) have compiled a very useful bibliography of research on race and drug use, including an introductory chapter by Johnson and Nishi that assesses the applicability and adequacy of recent theory and research in this area.

In summary, sociodemographic variables have most often emerged as interesting, but very limited, explanatory factors in both cross-sectional (Murty 1979) and longitudinal (Jessor and Jessor 1978; Kandel 1978a,b) research in recent years. Certain findings do hold up on the basis of current evidence, including the negative correlation between religiosity and most drug-use measures, and some differences in patterns of drug use over time on the basis of race and sex. There are some consistent findings or overrepresentation of some ethnic or racial groups in certain drug-use samples, particularly the opiates (McCoy et al. 1979). However, overall, current research supports a movement away from analyses focusing on traditional sociodemographic variables to more integrative theories of social context (especially peer and family) for both the prediction and understanding of adolescent drug use (Thomas et al. 1975; Schuman and Polkowski 1975; Dembo and Burgos 1976; Dembo et al 1978, 1980).

CONSIDERATIONS FOR THE FUTURE

The authors of these reviews have been asked to include suggestions for new directions for future work. In the case of personality and sociodemographic factors, the most interesting findings in recent research point the way to the most promising areas of investigation.

The developmental perspective, represented by a new attention to longitudinal study, has obviously taken a prominent place in current research. Some of the most provocative work in the field is specifically addressed to the "career" of drug use behavior and the stages of adolescent drug use (Kandel 1978a,b; Coombs et al. 1976). The personality literature now needs to give more attention to the cognitive and character development that parallels these behaviors (Fiddle 1978; Hockhauser 1978; O'Donnell and Clayton 1979). Specific stages or behaviors have different meanings depending on the age of the individual. Variables such as chronological age and grade in school do not capture all of what personality and developmental theory have to offer to the understanding of adolescent drug use. Issues such as responses to first opportunity for drug use; interaction patterns in peer networks; conceptualization of choices, decisionmaking, and consequences; stress responses; and psychosexual maturation all have unexplored relevance to the interpretation of drug use behavior. What is called for is more research that will integrate drug use behavior into comprehensive views of adolescent maturation and personality development. Of particular value would be research that can identify adaptive and maladaptive phasing of the different stages in drug use, cognitive development, moral development, and social skills.

New Directions for Sociodemographic Factors: The Importance of Environmental Relativity

It is probably impossible to overestimate the importance of context in considerations of psychosocial behaviors such as drug use. An overview of the demographic research highlights the need for attention to contextual issues, both in terms of subculture and environment, and in terms of historical factors. In addition, the mainstream of new work in this area has already moved to complex models of peer and family influence, with obvious contextual implications.

What is needed is increased research on detailed characteristics of particular social environments at various points in time. This means, for example, more specific data on differences within racial and ethnic categories and between neighborhoods, and greater attention to cohort effects and rapidly changing cultural events. In short, it suggests a more anthropological perspective on sociodemographic issues.

This kind of work is very complicated and methodologically challenging. Researchers like Padilla et al. (1979) give examples of how creative data gathering techniques will be necessary to maintain validity. Robins (1978) discusses the integration of setting and predisposition, and demonstrates one way to explore the impact of context on drug use.

Other researchers have raised similar issues (Shute 1975; Trice and Beyer 1977; Dembo et al. 1978; Johnson and Preble 1978; Huba et al. 1979).

One appropriate direction might be to accompany the current longitudinal survey work with more intensive analyses of smaller cohorts, as suggested by Clausen (1978). As the personality research needs to become more developmental and less categorical, the sociodemographic research would also benefit from moving away from efforts to explain variance by assigning individuals to categories, and focusing strongly on efforts to understand the meaning of behavior in specific contexts.

IMPLICATIONS FOR PREVENTION

The trends in recent research in these two areas have some implications for primary prevention activities. Most of the traditional personality research leads more naturally to discussions of the implications for therapy and treatment program design than to designing preventive interventions. The more prevention-minded personality researchers often point to early identification of high-risk types as the desired outcome. However, the broad sample personality correlate research has not isolated the designations of such types that would be specific and stable enough to guide the design of practical prevention interventions based on personality characteristics.
Concerning marijuana use, based on the data on the changing meaning of marijuana use in most adolescent networks, the issue of identifying "high risk" personality types for experimentation or occasional use is clearly beside the point. What would be useful to planners is more intensive analyses of data from converging sources (as in Smith and Fogg 1978) seeking the personality attributes that characterize those adolescents who move out of the mainstream into more seriously deviant behavior, such as criminal activities and addiction. This kind of information on different kinds of samples at various points along the drug use stages might begin to identify more clearly the leverage points for preventive interventions.

The sociodemographic variables, at their best, provide essential information for intervention design. Issues of prevalence, characteristics of target populations, and accurate data on changing patterns of drug use across subgroups are key inputs for prevention planning. Most of the recent research, however, suggests that traditional sociodemographic variables are not very useful for these purposes. Sex, SES, religion, rural/urban environment, and to some extent even race do not offer consistent direction on differential exposure to risk among subgroups. Situational variables like drug availability and characteristics of peer culture consistently provide more guidance on risk than sociodemographic variables (Smart 1977).

If first-use ages are declining (Kaplan et al. 1978; and others), then the age at which preventive interventions must take place must also be adjusted. Many prevention planners have already responded to this need. However, working with younger populations raises two serious problems for intervention design. First, since so many programs rely on school settings, program developers (as well as researchers) are faced with shifting their intervention sites from junior high and high schools to elementary and middle schools. More difficult community responses, teacher attitudes, and administrative structures will be major obstacles to this essential shift. Second, planners and researchers must take into account the developmental capacity of the children they seek to affect. For example, the cognitive abilities, comprehension, social behavior, and emotional development of latency-age children are very different from those of adolescents. For many programs, moving to younger ages will require at least extensive revision of content and technique, and some interventions may have to be abandoned because they require cognitive abilities beyond the capacities of younger children.

Finally, in considering new interventions, there is the need to continue to ask "Prevention of what?" As Goldberg and Myers (1980) point out, the realities of contemporary youth culture and epidemiological evidence call for a new focus on health promotion and the prevention of "harmful use," rather than an inflexible approach to all adolescent drug behavior. This will require more sophisticated data on the developmental stages of drug use among preadolescents and adolescents, a more complete understanding of cultural contexts within which behaviors must be interpreted, and more information on the lifetime consequences of various adolescent drug use patterns (Shute 1976; Myer 1976; Dembo et al. 1978; Kandel 1978a,b).

REFERENCES

Abelson, H., Fishburne, P., and Cisin, I. National Survey on Drug Abuse: 1977, Volume 1, Main Findings. National Institute on Drug Abuse. DHEW Pub. No. (ADM)78-618. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1977.

Ahlgren, A., and Norem-Hebeisen, A. Self esteem patterns distinctive of groups of drug busing and other dysfunctional adolescents. Int J Addict, 14:759-777, 1979.

Anhalt, H., and Klein, M. Drug abuse in junior high school populations. Am J Drug Alcohol Abuse, 3:589-603, 1976.

Arnini, F., Salasnek, S., and Burke, E. Adolescent drug abuse: Etiological and treatment considerations. Adolescence, 11:281-299, 1976.

Becker, C. Sex and drinking patterns: An old relationship revisited in a new way. Soc Prob, 24:482-497, 1977.

Beschner, G., and Friedman, A. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Beschner, G., and Treasure, K. Female adolescent drug use. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Blaine, J., and Julius, D. Psychodynamics of Drug Dependence. National Institute on Drug Abuse Research Monograph 12. DHEW Pub. No. (ADM)77-470. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1977.

Braucht, G., Brakarsh, D., Follingstad, D., and Berry, K. Deviant drug use in adolescence: A review of psychosocial correlates. Psychol Bull, 79:92-106, 1973.

Brook, J., Lukoff, I., and Whiteman, M. Peer, family, and personality domains as related to adolescents' drug behavior. Psychol Rep, 41: 1095-1102, 1977.

Brunswick, A. Black youths and drug use behavior. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Carlisi, J. Unique aspects of white ethnic drug use. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Carman, R. Internal-external control and drug use among junior high school students in a rural community. Int J Addict, 12:53-64, 1977.

Chein, I., Gerard, D., Lee, R., and Rosenfeld, E. The Road to H: Narcotics, Delinquency, and Social Policy. New York: Basic Books, 1964.

Clausen, J. Longitudinal studies of drug use in the high school: Substantive and theoretical issues. In: Kandel, D., ed. Longitudinal Research on Drug Use. Washington, D.C.: Hemisphere Publishing Corp., 1978.

Cockerham, W. Patterns of alcohol and multiple drug use among rural white and American Indian adolescents. Int J Addict, 12:271-285, 1977.

Cohen, A., and Santo, Y. Youth drug abuse and education: Empirical and theoretical considerations. In: Beschner, G., and Friedman, G., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Coombs, R., Fry, L., and Lewis, P. Socialization in Drug Abuse. Cambridge, MA: Schenkman Publishing Co., 1976.

Crawford, G. Precursors to heroin: A pilot study of young heroin addicts and their nonaddicted friends. Drug Alcohol Depend, 3:165-174, 1978.

Cunningham, W., Cunningham, I., and English, W. Sociopsychological characteristics of undergraduate marijuana users. J Genet Psychol, 125:3-12, 1974.

Curtis, B., and Simpson, D. Differences in background and drug use history among three types of drug users entering drug therapy programs. J Drug Educ, 7:369-376, 1977.

Davis, C. Marijuana and psychedelic use: Are they deviant responses? Drug Forum, 6:315-326, 1977-1978.

Dembo, R., and Burgos, W. A framework for developing drug abuse prevention strategies for young people in ghetto areas. J Drug Educ, 6: 313-325, 1976.

Dembo, R., Burgos, W., Babst, D., Schneidler, J., and LaGrand, L. Neighborhood relationships and drug involvement among inner city junior high school youths: Implications for drug education. J Drug Educ, 8:235-252, 1978.

Dembo, R., Burgos, W., DesJarlais, D., and Schneidler, J. Ethnicity and drug use among urban junior high school youths. Int J Addict, 14: 557-568, 1979.

Dembo, R., Schneidler, J., and Burgos, W. Life-style and drug involvement among youths in an inner city junior high school. Int J Addict, 15:171-188, 1980.

Dunnette, M. Causes and consequences of adolescent drug experiences. National Institute on Drug Abuse research report, no date.

Eichberg, R., and Bentler, P. Current issues in the epidemiology of drug abuse as related to psychosocial studies of adolescent drug use. In: Lettieri, D., ed. Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates. National Institute on Drug Abuse Research Issues 11. DHHS Pub. No. (ADM)81-299. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Evans, R., Schill, T., and Monroe, S. The relationship between guilt and quality of drug experiences. J Clin Psychol, 34:999-1000, 1978.

Ferguson, L., Freedman, M., and Ferguson, E. Developmental self-concept and (self-reported) drug use. Psychol Rep, 41:531-541, 1977.

Fiddle, S. Drug cognitive structures and strategies with special reference to drug education programs. J Drug Educ, 8:151-160, 1978.

Forsyth, R., and Sadava, S. Criteria measures of drug-using behavior: Multivariate analyses. Educ Psychol Meas, 37:641-658, 1977.

Freeman, J., and Freeman, W. When do they learn? A study of drug awareness in children in a rural elementary school. J Drug Educ, 7: 133-140, 1977.

Galchus, D., and Galchus, K. Drug use: Some comparisons of black and white college students. Drug Forum, 6:65-76, 1977-1978.

Ginsberg, I., and Greenley, J. Competing theories of marijuana use: A longitudinal study. J Health Soc Behav, 19:22-34, 1978.

Goldberg, P., and Meyers, E. The influence of public understanding and attitudes on drug education and prevention. In: The Facts about "Drug Abuse." The Drug Abuse Council. New York: The Free Press, 1980.

Goldstein, J., and Sappington, J. Personality characteristics of students who become heavy drug users: An MMPI study of an avant-garde. Am J Drug Alcohol Abuse, 4:401-412, 1977.

Gorsuch, R., and Butler, M. Initial drug abuse: A review of predisposing psychological factors. Psychol Bull, 8:120-137, 1976.

Green, J. Overview of adolescent drug use. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Green, L., and Haymes, M. Value orientation and psychosocial adjustment at various levels of marijuana use. J Youth Adolescence, 2:213-231, 1973.

Greenspan, S. Substance abuse: An understanding from psychoanalytic, developmental, and learning perspectives. In: Blaine, J., and Julius, D., eds. Psychodynamics of Drug Dependence. National Institute on Drug Abuse Research Monograph 12. DHEW Pub. No. (ADM)77-470. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1977.

Gulas, I., and King, F. On the question of pre-existing personality differences between users and nonusers of drugs. J Psychol, 92:65-69, 1976.

Hanson, D. Trends in drinking attitudes and behaviors among college students. J Alcohol Drug Educ, 22:17-22, 1977.

Harper, F., and Dawkins, P. Alcohol and blacks: survey of the periodical literature. Br J Addict, 71:327-334, 1976.

Hockhauser, M. Educational implications of drug abuse. J Drug Educ, 8:69-76, 1978.

Hogan, R., Mankin, D., Conway, J., and Fox, S. Personality correlates of undergraduate marijuana use. J Consult Clin Psychol, 35:58-63, 1970.

Huba, G., Wingard, J., and Bentler, P. Beginning adolescence drug use and peer and adult interaction patterns. J Consult Clin Psychol, 47:265-276, 1979.

Iiyama, P., Nishi, S., and Johnson, B. Drug Use and Abuse Among U.S. Minorities. New York: Praegen Publications, 1976.

Jessor, R. Predicting time of onset of marijuana use: A developmental study of high school youth. J Consult Clin Psychol, 44:125-134, 1976.

Jessor, R., and Jessor, S. Adolescent drinking and the onset of drinking. *J Stud Alcohol*, 36:27-51, 1975.

Jessor, R., and Jessor, S. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. New York: Academic Press, 1977.

Jessor, R., and Jessor, S. Theory testing in longitudinal research on marijuana use. In: Kandel, D., ed. *Longitudinal Research on Drug Use*. Washington, D.C.: Hemisphere Publishing Corp., 1978.

Johnson, B., and Preble, E. *Ethnography of Drug Use in Two White Ethnic Groups*. Final report of research. National Institute on Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, July 1978.

Johnston, L. Drug use during and after high school: Results of a national longitudinal study. *Am J Public Health*, 64(supplement):29-37, 1974.

Kandel, D. Convergences in prospective longitudinal surveys of drug use in normal populations. In: Kandel, D., ed. *Longitudinal Research on Drug Use*. Washington, D.C.: Hemisphere Publishing Corp., 1978a.

Kandel, D. *Longitudinal Research on Drug Use*. Washington, D.C.: Hemisphere Publishing Corp., 1978b.

Kandel, D., Kessler, R., and Margulies, R. Antecedents of adolescent initiation into stages of drug use: A developmental analysis. In: Kandel, D., ed. *Longitudinal Research on Drug Use*. Washington, D.C.: Hemisphere Publishing Corp., 1978.

Kaplan, H. Antecedents of deviant responses: Predicting from a general theory of deviant behavior. *J Youth Adolescence*, 6:89-101, 1977.

Kaplan, H. Social class, self-derogation and deviant response. *Soc Psychiatry*, 13:19-28, 1978.

Kaplan, J., Blum, R., Garfield, E., Johnstone, J., and Magistad, J. *Final Report: Drug Education, Further Results and Recommendations*. National Institute on Drug Abuse Research Report No. OA-01265. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, September 1978.

Kay, E., Lyons, A., Newman, W., Mankin, D., and Loeb, R. A longitudinal study of the personality correlates of marijuana use. *J Consult Clin Psychol*, 46:470-477, 1978.

Kirk, R. Drug use among rural youth. In: Beschner, G., and Friedman, A., eds. *Youth Drug Abuse*. Lexington, MA: Lexington Books, 1979.

Kleinman, P., and Lukoff, I. Ethnic differences in factors related to drug use. *J Health Soc Behav*, 19:190-199, 1978.

Klinge, V., Vaziri, H., and Lennox, K. Comparison of psychiatric inpatient male and female adolescent drug abusers. *Int J Addict*, 11: 309-323, 1976.

Knecht, S., Cundick, B., Edwards, D., and Gunderson, E. The prediction of marijuana use from personality scales. *Educ Psychol Meas*, 32:1111-1117, 1972.

Knight, R., Sheposh, J., and Bryson, J. College student marijuana use and societal alienation. *J Health Soc Behav*, 15:28-35, 1974.

Kohn, P., Annis, H. Personality and social factors in adolescent marijuana: A path-analytic study. *J Consult Clin Psychol*, 46:366-367, 1978.

Krug, E., and Henry, T. Personality, motivation, and adolescent drug use patterns. *School Psychol Dig*, 5:17-23, 1976.

Loper, R., Kammeier, M., and Hoffman, H. MMPI characteristics of college freshman males who later became alcoholics, *J Abnorm Psychol*, 82:159-162, 1973.

McCann, H., Steffenhagen, R., and Muriam, G. Drug use: A model for a deviant sub-culture. *J Alcohol Drug Educ*, 23:29-45, 1977.

McCoy, C., McBride, D., Russe, B., Page, J., and Clayton, R. Youth opiate use. In: Beschner, G., and Friedman, A., eds. *Youth Drug Abuse*. Lexington, MA: Lexington Books, 1979.

Margulies, R., Kessler, R., and Kandel, D. A longitudinal study of onset of drinking among high school students. *J Stud Alcohol*, 38: 897-912, 1977.

Miller, B. Student drug use: Attitudinal, parental relations, and sex differences - a pilot study. *Int J Addict*, 11:1079-1084, 1976.

Miranne, A. Marijuana use and achievement orientation of college students. *J Health Soc Behav*, 20:194-199, 1979.

Murty, L. Drug use in college students: A test of sociodemographic and reference group models of explanation. *Int J Addict*, 14:797-808, 1979.

Myer, D. The role of ethnic awareness in affective education and drug abuse prevention. In: *Selected Reports of the Addictions Prevention Laboratory, Vol. 1*. Department of Counselor Education, College of Education, Pennsylvania State University, 1976.

Naditch, M. Ego mechanisms and marijuana usage. In: Lettieri, D., ed. *Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates*. National Institute on Drug Abuse Research Issues 11. DHHS Pub. No. (ADM)81-299. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Norem-Hebeisen, A. Self-esteem as a predictor of adolescent drug abuse. In: Lettieri, D., ed. *Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates.* National Institute on Drug Abuse Research Issues 11. DHHS Pub. No. (ADM)81-299. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

O'Donnell, J., and Clayton, R. Determinants of early marijuana use. In: Beschner, G., and Friedman, A., eds. *Youth Drug Abuse.* Lexington, MA: Lexington Books, 1979.

Oetting, E., and Goldstein, G. Drug use among Native American adolescents. In: Beschner, G., and Friedman, A., eds. *Youth Drug Abuse.* Lexington, MA: Lexington Books, 1979.

Padilla, E., Padilla, A., Morales, A., Olnedo, E., and Ramirez, R. Inhalent, marijuana, and alcohol abuse among barrio children and adolescents. *Int J Addict*, 14:945-964, 1979.

Paton, S., and Kandel, D. Psychological factors and adolescent illicit drug use: Ethnicity and sex differences. *Adolescence*, 13:187-200, 1978.

Paton, S., Kessler, R., and Kandel, D. Depressive mood and adolescent illicit drug use: A longitudinal analysis. *J Genet Psychol*, 131: 267-289, 1977.

Plumb, M., D'amanda, C., and Taintor, Z. Chemical substance abuse and perceived locus of control. In: Lettieri, D., ed. *Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates.* National Institute on Drug Abuse Research Issues 11. DHHS Pub. No. (ADM)81-299. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Poulsen, R., Pettibone, T., and Willey, D. The ethnic variable and problem drinking in a select sample of southwestern two-year multicultural college students. *Am J Drug Alcohol Abuse*, 5:497-506, 1978.

Rathus, S., Diegal, L, and Rathers, L. Attitudes of middle-class heroin abusers towards representatives of the educational system. *Adolescence*, 11:1-6, 1976.

Robins, L. The interaction of setting and predisposition in explaining novel behavior: Drug initiations before, in, and after Vietnam. In: Kandel, D., ed. *Longitudinal Research on Drug Use.* Washington, D.C.: Hemisphere Publishing Corp., 1978.

Sadava, S. Research approaches in illicit drug use: A critical review. *Genet Psychol Monogr*, 91:3-59, 1975.

Schlegel, R., and Sanborn, M. Religious affiliation and adolescent drinking. *J Stud Alcohol*, 40:693-703, 1979.

Schuman, S., and Polkowski, J. Drug and risk perception of ninth grade students: Sex differences and similarities. *Community Ment Health J*, 11:184-194, 1975.

Schwarz, R., Burkhart, B., and Green, B. Turning on or turning off: Sensation seeking or tension reduction as motivational determinants of alcohol use. *J Consult Clin Psychol*, 46:1144-1145, 1978.

Segal, B. Personality factors related to drug and alcohol use. In: Lettieri, D., ed. *Predicting Adolescent Drug Abuse: A Review of Issues, Methods, and Correlates.* National Institute on Drug Abuse Research Issues 11. DHHS Pub. No. (ADM)81-299. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Segal, B. Reasons for marijuana use and personality: A canonical analysis. *J Alcohol Drug Educ*, 22:64-67, 1977.

Shute, R. The impact of peer pressure on the verbally expressed drug attitudes of male college students. In: *Selected Reports of the Addictions Prevention Laboratory*, *Vol. 1*. Department of Counselor Education, College of Education, Pennsylvania State University, 1976.

Simon, W. Psychological needs, academic achievement and marijuana consumption. *J Clin Psychol*, 30:496-498, 1974.

Simon, W., Simon, M., Primavera, L., and Orndoff, R. A comparison of marijuana users and nonusers on a number of personality variables. *J Consult Clin Psychol*, 42:917-918, 1974.

Smart, R. Perceived availability and the use of drugs. *Bull Narc*, 29:59-63, 1977.

Smith, G., and Fogg, C. Psychological predictors of early use, late use, and nonuse of marijuana among teenage students. In: Kandel, D., ed. *Longitudinal Research on Drug Use*. Washington, D.C.: Hemisphere Publishing Corp., 1978.

Smithyman, S., Plant, W., and Southern, M. Locus of control in two samples of chronic drug abusers. *Psychol Rep*, 34:1293-1294, 1974.

Sorosiak, F., Thomas, L., and Balet, F. Adolescent drug use: An analysis. *Psychol Rep*, 38:211-221, 1976.

Spevack, M., and Pihl, R. Nonmedical drug use by high school students: A three-year survey study. *Int J Addict*, 11:755-792, 1976.

Steffenhagen, R. Toward a self-esteem theory of drug dependence: A position paper. *J Alcohol Drug Educ*, 22:1-3, 1977.

Stokes, F. Personality traits and attitudes and their relationship to student drug using behavior. *Int J Addict*, 9:267-287, 1974.

Szapocnik, J., Ladner, R., and Scopetta, M. Youth drug abuse and subjective distress in a Hispanic population. In: Beschner, G., and Friedman, A., eds. Youth Drug Abuse. Lexington, MA: Lexington Books, 1979.

Thomas, C., Peterson, D., and Zingroff, M. Student drug use: A reexamination of the "hang loose ethic" hypothesis. J Health Soc Behav, 16:63-73, 1975.

Tolone, W., and Dermott, D. Some correlates of drug use among high school youth in a midwestern rural community. Int J Addict, 10:761-777, 1975.

Trice, H., and Beyer, J. A sociological property of drugs: Acceptance of users of alcohol and other drugs among university undergraduates. J Stud Alcohol, 38:58-73, 1977.

Wechsler, H., and McFadden, M. Drinking among college students in New England. J Stud Alcohol, 40:969-996, 1979.

Weckowicz, T., and Janssen, D. Cognitive functions, personality traits, and social values in heavy marijuana smokers and nonsmoker controls. J Abnorm Psychol, 81:264-269, 1973.

Zimmering, P., Toolan, J., Safrin, R., and Wortis, S. Drug addiction in relation to problems of adolescence. Am J Psychiatry, 109:272-278, 1952.

Zinberg, N. Addiction and ego function. Psychoanal Stud Child, 30:567-588, 1975.

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From Family to Peer: Transitions of Influence Among Drug-Using Youth

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There are a growing number of parent groups, in this country and abroad,[1,2] concerned with the use of drugs among children and youth. These groups raise a number of legitimate questions. The most essential of these questions revolves around a concern with the struggle for control of adolescent and even preadolescent behavior. Many of these parents have begun to feel, at least regarding their children's drug use, that their authority is being undermined by various social elements. They believe that families no longer have primary control over their children's behavior, that this control has been eroded by and passed into the hands of such external elements as the media, the government, and the peer group. Although many parents may see the media and the government as the ultimate sources of this erosion of control, it is with the more proximate and accessible peer group that most parent groups are primarily concerned (Manatt 1979). They feel that more can be accomplished by actively attempting to regain control on a local, more manageable level while continuing to exert pressure on the more nationally oriented media and government.

This concern with conflict between parents and peers is, of course, not new. It is one of the most predictable and, in Western society, probably least avoidable of developmental conflicts. What is new, however, is the sharp and specific focus upon the relative influence of parents and peers on youthful drug use. This focus upon drug use is not surprising since this behavior has increased substantially over the past several years (Johnston et al. 1979, 1980) and attitudes toward drug use provide what is one of the most distinctive and emotional conflicts between the generations (Kandel 1974a, 1978; Stone et al. 1979). Yet, as important as this issue has become, there conflicting evidence and assumptions remain concerning the nature of parent and peer influence on drug use. The purpose of this paper, then, is to 1) review the evidence and assumptions that have been developed thus far and 2) present these conflicts in such a way as at least to delineate clearly their nature and source, if not to resolve them.

This review will begin by noting some of the more significant work in the area of family and peer influence on adolescent behavior and then focus more specifically on those studies related to drug use. A brief final section will attempt to summarize the current state of knowledge in this area as well as suggest future directions for research.

FAMILIES AND PEERS: INTERACTIONAL AND INDEPENDENT INFLUENCES

The study of the relative influence of family and peers on adolescent behavior has, in general, been considered from a developmental perspective (Ausubel et al. 1977; Douvan and Gold 1966). This view regards the family as the primary provider of status, nurture, training, and other crucial elements of socialization until adolescence. Then, as the youth strives to assert his or her independence, a wider array of active influence sources come into play, the most significant being the peer group.

While these other sources of influence, e.g., the media, school, and government, are of importance, they are nevertheless mediated by the adolescent's primary sources of socialization: the family and the peer group. These two remain as primary sources because they are able to satisfy the adolescent's "intense preoccupation with social experience" (Ausubel et al. 1977).

Although research in this area appears to agree that these two groups account for a substantial portion of the influence on adolescent behavior, there is considerable disagreement concerning their relative contributions to this influence. Within the broad developmental perspective which characterizes this area of study, several theoretical approaches have been developed that demonstrate this divergence of views.

THEORETICAL APPROACHES: EXAMPLES

While there is no widely accepted theory concerning the relative influence of family and peers on adolescent behavior, a number of researchers have suggested theoretically based approaches that aid in illuminating their findings.

Strength of Parental Influence

Hirschi (1969), for example, has developed what he calls social control theory, a basic premise of which is that parents have a direct, independent effect on their adolescent's delinquent behavior. Hirschi believes that this effect holds regardless of whether or not the adolescent interacts with delinquent friends. His schema asserts that the influence of the peer group is causally unnecessary in the development of delinquent behavior. Hirschi bases his assertion on his belief that delinquents are not socially integrated, that they have failed to develop a bond with society and that, as such, the more socially integrated peer groups are not able to exert social control over the delinquent. Hirschi's data (and Jensen's 1972 reanalysis of the same data) suggest, instead, that within the social framework it is the delinquent's parents who may exercise the most control over his or her behavior. Neither Hirschi nor Jensen, of course, suggests that parental control is total or unchallenged but that, relative to the influence of peers, it appears to be the stronger of the two.

While not as theoretically based, perhaps, others have supported Hirschi's position. Blum and associates (1972), for example, present data that suggest that the family may remain ultimately more influential than the peer group throughout adolescence. Others supporting this position include Coleman 1961; Clausen 1966; Larsen 1972, 1974; and Solomon 1961.

Strength of Peer Influence

Sutherland (Sutherland and Cressey 1970), on the other hand, does not believe that parents have an immediate, direct effect upon their children's deviant behavior. Sutherland's theory of differential association, more comprehensive than Hirschi's and based on such basic social psychological theories as those of Mead (1934) and Cooley (1909), asserts that the crucial factor in adolescent delinquent behavior is the availability of deviant role models in the adolescent peer group. The basis of this assertion is Sutherland's prediction that an individual's behavior is based on the sum total of the interaction he or she has with individuals who provide role models favorable or unfavorable to that behavior. Regarding deviant behavior, therefore, he theorizes that unless they teach or model deviant behavior themselves, the only significant effect parents will have on their adolescent's deviant behavior is to create situations in which their children will have access to deviant peer groups.

Again, support for this theory exists, although not anchored in theory to the extent of Sutherland and in less categorical form. Bowerman and Kinch (1959), for example, suggest that most adolescents are primarily influenced by peers, but that this influence is processual rather than exclusive. Their data indicates that a transition or shift from a family to a peer orientation takes place over a number of years. Ausubel (Ausubel et al. 1977) also suggests the existence of a transitional phase in the adolescent's shift from family to peer orientation. His "satellization" theory suggests that young children initially identify with and derive status from the family. During adolescence the process of "desatellizing" usually takes place as the children begin to look beyond their family for sources of attitudes and values. Other sources of support for this transitional movement toward an exclusive, or nearly exclusive, adolescent peer orientation include Glueck and Glueck 1950; Edwards and Brauberger 1973; Floyd and South 1972; Gottlieb and Ramsay 1964; Freidenburg 1963; and Rosen 1955.

Selective Influences of Family and Peers

Finally, in between these "exclusive" or "hydraulic" theories (Kandel and Lesser 1972) of family and peer influence, lie several theoretical approaches that view these influences as situation- or domain-dependent.

Kandel et al. (1978a), for example, propose a "generalized social interaction" model of interpersonal influence. According to this model:

> ...Adolescents could display different levels of responsiveness to social influences. There may be areas of behavior in which adolescents will show high reliance on parents and low reliance on peers, or vice versa, that is, they will behave according to an exclusive theory. In other domains of behavior and under different social or cultural conditions or both, adolescents will display high reliance on both parents and peers, that is, they will confirm a theory of generalized social interaction. (Kandel et al. 1978b, p. 94)

Curtis (1974) presents a "theory of adolescent's shifts in reference sources," which is less a theory in itself than an amalgamation of previous theories. He suggests four processes by which adolescents shift their valuations between family and peers: (1) Push: This process assumes that adolescents seek extrafamilial interaction to fulfill needs unmet in the family context; (2) Pull: This process is postulated on a decline in the adolescent's valuation of parental opinions because of an increased attraction to peer positions; (3) Selective Attachments: This process suggests, in a manner similar to Kandel et al. (1978a,b), that adolescents support both peer and parent orientations but only on an activity- or value-specific basis; and (4) Drift: This process is the least specific and suggests that adolescents move into and through family and peer alliances by chance circumstance.

Curtis' own data (1974) support the notion that the process of "selective attachments" may be the most useful of the processes he suggests in explaining the relative influence of family and peers on adolescent behavior.

Additionally, both Brittain (1963) and Kandel and Lesser (1972) present data that further reinforce the contention that continuity or discontinuity between family and peers is neither total nor pervasive. Their data suggest that adolescent and adult separateness is relative and varies with the issue involved. For example, topics that are of immediate importance or are present-oriented are most likely to be influenced by peers; for future or goal-oriented topics, the family and other adults are likely to be more influential.

The theoretical positions outlined above demonstrate the diversity and divergence of both opinion and data-based research results on this issue. The following section, focusing on family and peer influence on adolescent drug use, may aid in clarifying some of these findings.

FAMILY AND PEER INFLUENCE ON ADOLESCENT DRUG USE

Kandel (1980b,c) observes that much of the existing research in the drug field is either atheoretical or, where an attempt has been made to operate within a theoretical framework, poorly developed. While some attempt has been made to remedy this situation, either through efforts to integrate relevant theories (Lettieri et al. 1980) or through the development of sophisticated methodologies (e.g., Bentler

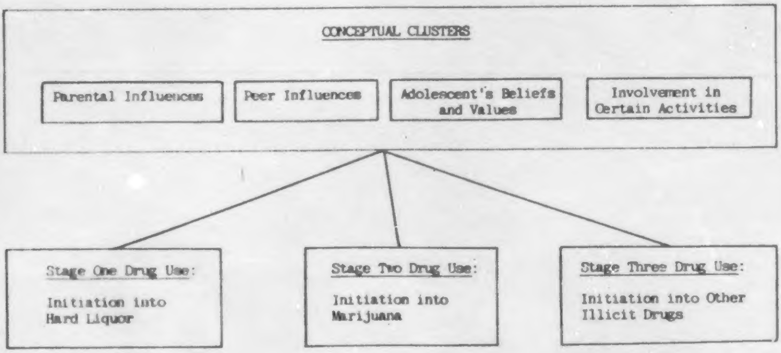
1980; Bentler et al. 1976), it is clear that without guiding theories our understanding of drug behavior cannot be significantly advanced.

Any attempt to consider the relative influence of family and peers in a theoretical context, then, is made difficult by this paucity of applicable theory. A model such as that developed by Jessor and Jessor (1977) to explore problem behavior and adolescent psychosocial development may eventually serve as a framework for theoretical development of this problem, but appears to be too broad to serve adequately at this time. The Jessors' model encompasses three major systems--the personality, the perceived environment, and the behavior system. The amount and sophistication of the work carried out thus far on family/peer influence on drug use is not sufficient to be appropriately applied to this complex theoretical structure.

At the present time, a model more relevant for this problem is that developed by Kandel and her colleagues (e.g., Kandel 1973, 1974a,b; Kandel and Faust 1975; Kandel et al. 1976a,b, 1978a,b). This developmental model considers each of the three stages of drug use (initiation into hard liquor, marijuana, and other illicit drugs) from the perspective of four conceptual clusters (parental influences, peer influences, adolescent's beliefs and values, and involvement in certain activities; figure 1). In this way, Kandel is able to include both of the major sources of interpersonal influence as well as the relevant intrapersonal characteristics of the adolescent. Methodologically, Kandel considers the elements of each of these clusters "...as additive sources of influence in a multiple regression analysis" (Kandel et al. 1978a). As such, their relative contribution to adolescent drug-using behavior can be reasonably assessed.

Figure 1

Model of Family and Peer Influence on Adolescent Drug Use
(based on concepts of Kandel et al. 1978a)


CONCEPTUAL CLUSTERS
Parental Influences
Peer Influences
Adolescent's Beliefs and Values
Involvement in Certain Activities
Stage One Drug Use:
Initiation into Hard Liquor
Stage Two Drug Use:
Initiation into Marijuana
Stage Three Drug Use:
Initiation into Other Illicit Drugs

For the purposes of this review, only a portion of this model, that dealing with sources of interpersonal influence, will be followed in presenting the research conducted thus far on family and peer influences on adolescent drug use. It is important to remember, however, that the other two conceptual clusters, adolescent beliefs/values and adolescent activities, may contribute equally or more to the prediction of adolescent initiation into the use of certain substances.

Naturally, with the exception of the work of Kandel et al., this research has not been conducted to conform to this model. Therefore, some results will not adequately fit into either of the two conceptual clusters being considered here, and there will be considerable overlap among findings. Nevertheless, as will be seen, the bulk of current research in this area falls within these conceptual clusters.

A final note regarding this research concerns the notion of causality. Only a few researchers, among them Kandel and her colleagues, the Jessors, Brook and Lukoff, and Bentler, Huba, and their colleagues have conducted longitudinal studies that directly address relative family and peer influences on drug use; only Kandel et al. collected family and peer data from the family and peers themselves, rather than relying on the respondent's perceptions. All other research cited either directly addresses family and/or peer influences in a cross-sectional approach or else presents data on this issue which are a by-product of the primary aims of the research. Therefore, ascribing causal status to any of the variables discussed below would not be appropriate.

Interpersonal Influences on Adolescent Drug Use: Independent and Relative Effects

In discussing the basis of their model, Kandel et al. (1978a,b) posit three ways in which interpersonal influences may operate: (a) Directly: One person influences the behavior of another by providing a model, appropriate reinforcement, or an intimate relationship; (b) Indirectly: One person influences the development of another's values, attitudes, or behaviors, an influence that takes place over a period of time and may not be strictly linear; and (c) Conditionally: One source of influence affects a focal person's opportunity or susceptibility to be influenced by another. Further, Kandel et al. suggest that two primary social learning processes, imitation and reinforcement (Bandura and Walters 1963; Rotter 1966; Maccoby 1968), provide the means by which direct, indirect, or conditional interpersonal influences may be transmitted. Finally, the conditions necessary for either of these processes to become operative, and the extent to which they will do so, depend upon the quality and nature of the relationship of the source of influence and the focus of the influence, the characteristics of the focal individual, and the situation at hand. This complex process of interpersonal influence builds upon the field theory of Lewin (1936), the communication theory of Hovland et al. (1953) and, more recently, the social and personality theories of Clausen (1968) and Mischel (1973).

The process described above provides the foundation, whether explicitly or by implication, for much of the research conducted thus far on family and peer influences on adolescent drug use. The relative effects of these two sources of interpersonal influence, family and peers, will be considered on the basis of the extant research. Kandel's model of stages of drug use provides the outline for this review.

Independent Family Influence on Adolescent Drug Use

There is an extensive and growing literature concerning the role of the family in the drug use of one or more of its members (Seldin 1972; Harbin and Maziar 1975; Stanton 1978, 1979). As in any relatively new field, much of this literature is either descriptive, e.g., characteristics of the addict's family, or quite broad in scope, e.g., the need for and methods of family therapy for the user.[3] More specific topics, such as that under consideration here, have not yet been extensively subjected to rigorous, systematic research. Nevertheless, family influences on adolescent drug use have certainly been addressed in the literature and, in some cases, quite rigorously (e.g., Kandel 1978a,b; Jessor and Jessor 1977). This interest appears to be in two phases, the first in the early 1970's in response to initial concerns with growing adolescent drug (and particularly marijuana) use, and the second more recently, after a mid-1970's hiatus when early concern with adolescent use somewhat abated and marijuana was accorded the status of a substance at least only mildly harmful, if not benign. In the review of this literature, as noted above, the role of family influence will be considered for each of the stages of initiation to drug use suggested by Kandel.

Stage One: Initiation into Hard Liquor

Kandel[4] suggests that parents play a substantial, but quite specific, role in influencing adolescent initiation into the use of hard liquor. Her data suggest a direct modeling effect in which the process of imitation on the part of the adolescent is at work, a finding enhanced by Bandura and Walter's (1963) suggestion that imitation is fostered when it takes place within a nurturing relationship. While parental use of hard liquor is a moderately good interpersonal predictor of adolescent use, the quality of the parent-child relationship and parental attitudes and values appear to be of considerably less importance. The one attitude/value area that may have some influence is parental attitude toward the harm of casual liquor use. A parental approach based on reasoning, rather than control through the setting of strict rules and limits, appears to be more successful in delaying or minimizing adolescent initiation into hard liquor use.

Considerable support for both of these findings—the influence of parental drinking and the effect of parenting styles in approaching adolescent liquor use—is found in the literature.

Maddox (1970) found that knowledge of parental drinking patterns was the single most important tool for predicting adolescent drinking patterns. Although not limiting their studies to alcohol use, others have also found parental drinking behavior to be a strong factor in influencing adolescent initiation into alcohol use (Braucht et al. 1973; Gorsuch and Butler 1976; Annis 1974; Smart and Fejer 1972; Goode 1975; Jessor and Jessor 1975; Scherer 1973; Chein et al. 1964; Rosenberg 1969). Lawrence and Vellerman (1974) reported similar findings and, in addition, reported that the most significant factor influencing adolescent alcohol use was not just whether and how often one or both parents drank but how much they drank each time, i.e., whether they drank to intoxication or had a single drink. Blum and associates (1969, 1972) also suggested an association between parents who offered a predinner cocktail to guests and adolescents who were more susceptible to initiation into the use of liquor.

Support for the finding that a reasoned, democratic parenting style may have a positive effect on adolescent drug (including alcohol) use is found in the review by Braucht et al. (1973) of correlates of deviant drug use in adolescence, in which they note that adolescent users are usually subject to deficient parenting styles, particularly those involving over- or under-domination or rejection; in Hunt (1974) and Blum and associates (1972), who suggest that a laissez-faire or liberal parenting style may make the adolescent particularly susceptible to initiation of use; and in Baumrind (1971, 1975), who suggests that a prolonged period of parental effort at strict control may promote rather than discourage use.

Finally, some evidence is found for the positive influence on adolescent drinking of good parent-child relationships, a factor which Kandel's data do not strongly support. Once again citing studies that do not necessarily distinguish alcohol use from other drug use (a point, of course, which confounds any direct comparison with the Kandel data)[5], there is some indication that attachment to the family,[6] positive family relationships (Adler and Lotecka 1973; Wechsler and Thum 1973a,b; Shibuya 1974), and positive involvement with the family (Jessor and Jessor 1975, 1977) discourage initiation into use, while family friction and fights (Russell 1972; Lawrence and Vellerman 1974) may encourage use.

Stage Two: Initiation into Marijuana

Kandel found parental influences on adolescent marijuana use to be quite small. In particular, and in contrast to use of hard liquor, adolescent initiation into marijuana was "virtually unrelated" to any type of drug use on the part of parents. What parental influence was found appeared to be based on parental attitudes and closeness of relationship with their children, i.e., parents whose relationships with their children were strong enough to enable them to forbid or strongly discourage marijuana use and still hold the relationship together were more successful in minimizing initiation than those parents whose attitudes and behavior suggested a more permissive stance, a finding supported by both Jessor and Jessor (1977) and Blum and associates (1972). Kandel cautions, however, that this view may reflect adolescent selective perception since these same attitudes as reported by parents were not significant predictors of initiation.

While there is no research that indicates that parents have a powerful influence on adolescent initiation into marijuana use, there are several studies suggesting that parents may have a somewhat more influential role than that reflected in the Kandel studies. These findings, however, are subject to the direct-comparison and self-report difficulties cited earlier and therefore may reflect the same selective perception that Kandel speculated was active in her data.

Nonetheless, in addition to those studies cited in the corresponding section in Stage One suggesting that parental drug use directly influences adolescent drug use, others supporting this finding and relating it specifically to adolescent marijuana use (among other drugs) are Brook et al. (1977), Hochman (1972), Tec (1970, 1972,a,b,c, 1974a,b), and Lavenhar et al. (1972).

Studies supporting the notion that positive parent-child relationships will influence marijuana use include those cited in the corresponding section in Stage One and the following studies, which are more specifically addressed to marijuana use. Burkett and Jensen (1975) found a relationship between family involvement/atttachment and adolescent marijuana use; Jessor (1976) and Jessor et al. (1973) reported that the perception of strong parental support and greater involvement with parents was related to minimized initiation to adolescent marijuana use; Tec (1974a) suggested that the salience of the family and the degree of satisfaction the adolescent derived from the family influenced his/her marijuana use; Blum and associates (1972) reported that adolescents whose families made strong efforts to meet their emotional needs were not at great risk of being significantly involved in marijuana use; and Stone (1979) presented data that suggested that adolescents with a strong family orientation experience minimized initiation into marijuana use.

Stage Three: Initiation into Other Illicit Drugs

Kandel reports that adolescent initiation into the use of illicit drugs other than marijuana appears to be strongly related to parental influences. The quality of the parent-child relationship appears to be particularly important. The adolescent's feelings of closeness to the family predicted low likelihood of initiation into other illicit drugs, while strict controls (see discussion, Stage One) and parental disagreement about discipline predicted higher likelihood of initiation. Additionally, parental drug use was, again, an important predictor.

There are few other data in the literature that specifically address parental influences on adolescent use of illicit drugs other than marijuana. The majority of the studies cited earlier investigate and note the importance of the influence of parent-child relationships and parental use patterns with regard to adolescent use of these drugs. They do not, however, single out this stage of initiation for analysis as does Kandel, thus making comparisons a speculative activity.

A report by Smart and Fejer (1972), however, does support the data presented by Kandel et al. (1978a,b) which suggest a strong relationship between parental use, both licit and illicit, of psychoactive, mood-changing drugs (other than marijuana) and adolescent initiation into illicit use of these substances. Further, Kandel (1974a), in an early article, characterized adolescent use of illicit psychoactive substances as a manifestation of "...the cultural ethos... a juvenile manifestation of behavior engaged in by adults" (pp. 110-111). Support for this theory may be seen in Tec (1974b) and Goode (1975), who both discussed this phenomenon in terms of "generational continuity."

As may be seen above, the influence of the family differs in each stage of adolescent drug use. Parents appear to be influential concerning adolescents' initiation into hard liquor use and, in particular, their initiation into use of illicit drugs other than marijuana. Parental influence appears to be somewhat diminished, however, with regard to initiation into marijuana use. With these differences in mind, the following section will now consider the existing research on independent peer influences upon the adolescent's initiation into different stages of drug use.

Independent Peer Influence on Adolescent Drug Use

Peer influences on adolescent drug use have received less research attention than the role of the family in this behavior. The role of peers has not been ignored as much as it has been considered as one of many factors influencing adolescent drug use; the role of the family, on the other hand, has often been singled out for study.

Peer influence has, nevertheless, been examined by a significant number of researchers. Braucht et al. (1973), Ferguson et al. (1974) and Gorsuch and Butler (1976), for example, each devote a considerable portion of their reviews of adolescent drug use to research on peer influence. Also, Kandel, Jessor and Jessor (1977), Johnson (1973), Bentler and his colleagues (e.g., Huba et al. 1979) and others have gathered a significant amount of peer-related data within their more extensive research programs. Finally, a number of individual studies (see below) have considered independent peer influences on adolescent drug use. A review of this research, continuing to utilize Kandel's stages model as an outline, is presented below.

Stage One: Initiation into Hard Liquor

Adolescents' and their friends' perceptions of how many of their friends are using hard liquor, actual use of hard liquor by friends, best friends' attitudes about the harmfulness of hard liquor, and the degree of adolescent involvement in peer activities (e.g., attending parties, driving around) were the most important peer factors found by Kandel to predict adolescent initiation into hard liquor use.

As noted by Kandel (1974a,b) and Bowker (1974), reliance upon adolescent perceptions of their friends' drug use may be misplaced because these perceptions may be highly inaccurate due to factors such as the respondents' attitudes, current use patterns, parents' attitudes, and so on. The modeling effect based on friend's actual use, however, may be the most important factor in initiation to hard liquor use. Although only Kandel and Brook et al. (1977) have obtained actual use data from friends, a number of other studies have also suggested that peers' use of hard liquor (among other drugs), may be the best peer-related predictor of adolescent initiation to these substances (Suchman 1968; Jessor et al. 1972; Jessor and Jessor 1975, 1977; Gusfield 1970; Haberman et al. 1972; Forslund and Gustafson 1970; Braucht et al. 1973; Gorsuch and Butler 1976; Lavenhar et al. 1972; McKillip et al. 1973; McBride[6]).

Also, there is some indication that certain peer behaviors and attitudes may cluster around particular drugs (including hard liquor), rather than there being any one "peer drug culture" (Johnson 1973; McKillip et al. 1973; Huba et al. 1979). Further, Suchman (1968) suggests that peer pressure to use particular substances increases as the adolescent moves from alcohol to marijuana to other illicit drugs.

Stage Two: Initiation into Marijuana

Peer influences on marijuana use are, according to Kandel, "substantial and varied." Friends' actual and perceived use, friends' actual and perceived espousal of values and attitudes conducive to use, and availability of the drug are peer factors that strongly predict adolescent initiation to marijuana use. Kandel notes that marijuana, as opposed to alcohol, is a substance associated with youth, and that the range and importance of peer factors in predicting use are considerably greater for marijuana than for alcohol. As such, exposure to peers who use marijuana and/or have favorable attitudes toward it has in fact become a source of adolescent socialization.

The strength of peer influence, direct and indirect, on marijuana use, as reported by Kandel, has considerable support in the literature. Considering marijuana use specifically, peer modeling effects appear to be substantial (Jessor 1976; Jessor and Jessor 1975, 1977; Hochman 1972; Stone et al. 1979; Goode 1969, 1970; Griffin and Griffin 1978; Krohn 1974; Tec 1970, 1972a,b,c, 1974a,b; Sadava 1973a,b; Sadava and Forsyth 1977; Suchman 1968; Braucht et al. 1973; Gorsuch and Butler 1976; Burkett and Jensen 1975; Burkett 1977; O'Donnell et al. 1976; Huba and Bentler, in press; Huba et al., in press).

Also, a number of studies suggest that what, as noted earlier, Kandel and Lesser (1972) referred to as a "hydraulic" or "exclusive" influence process may be active with regard to peer influences on adolescent marijuana use. This is particularly true with regard to attitudes and beliefs rather than specific behaviors. Adler and Lotecka (1973) and Block et al. (1974), for example, suggest that peer influence grows as the reliable (whether perceived or actual) drug-related information peers are able to provide grows; Johnson (1973) considers the attitudes and beliefs of the peer culture to be a transitional stage between the family and drug cultures; Tec (1972a) describes growing peer influence as attachment to parents diminishes; and Stone et al. (1979) suggest that as "peer orientation" grows, so also does initiation to marijuana use.

Stage Three: Initiation into Illicit Drugs

Kandel has found that the influence of the peer group as a whole, in comparison to alcohol and marijuana use, is considerably diminished with regard to use of other illicit drugs. Rather, it is the actual use of all types of drugs by the adolescent's best friend and low levels of intimacy with even that best friend that are the strongest peer-related predictors of an adolescent's initiation into use of illicit drugs other than marijuana. Based on this evidence, Kandel et al. (1978a) suggest that

> Youths who start using other illicit drugs, although greatly influenced by association with individual drug users, may be youths who have been unable to develop intimate and meaningful ties with their peers. (p. 89)

There do not appear to be other studies that have focused on peer influences and adolescent initiation into use of these drugs. Studies have suggested, as noted earlier, that adolescents' attitudes and behaviors may differ by the drug(s) they are using (Huba et al. 1979; Johnson 1973; McKillip 1973) but a clear delineation of these influences by drug has not been forthcoming.

CONCLUSIONS: RELATIVE FAMILY AND PEER INFLUENCES ON ADOLESCENT DRUG USE

As a concession to clarity of presentation this review has discussed the research on family and peer influences as independent factors. Adolescent development, of course, does not proceed along such linear, independent paths. Rather, there are multiple, continual, simultaneous influences of varying strengths acting not only upon the adolescent but upon these influence sources and between these influence sources and the adolescent. This section presents the findings described earlier in the context of this complex matrix of interpersonal influences. Although, recognizing the numerous sources of influence on adolescent behavior, it limits the sources of influence under consideration to family and peers and their relative influence on adolescent drug-related behavior. It should be remembered, also, that the source of these conclusions is studies that are not necessarily comparable either in their focus or methodology. Nevertheless, the following conclusions, however tentative, should offer researchers hypotheses and research questions on which to base future study.

General Conclusions

- There does not appear to be any point at which the drug behavior of most adolescents is wholly influenced by either family or peers. The "hydraulic" or "exclusive" theory of family versus peer influence, in which gross family influence is theorized to diminish as peer influence grows, does not seem to be fully supported, although the overall balance of influence appears to shift toward the peer group; this shift to the superiority of peer influence is particularly noted in initiation to marijuana use, where the family may have very little influence.

- Adolescent acceptance of either family or peer influence with regard to the use of any particular drug has not been found to be a rejection of the others' values and influence. Adolescents who reject parental influence and follow their peers in marijuana use, for example, have not necessarily been found to be rejecting their parents across all other influences. Rather, adolescents seem to rely upon peers and family as resources at different times and under different circumstances.

- Family and peer influence appears to follow a somewhat predictable pattern across the stages of drug use. Parent and peer influences on adolescent alcohol use appear to be relatively equal; peer influence appears substantially greater than family influence in marijuana use; and the influence of the family appears to be stronger where illicit drugs other than marijuana are concerned.

- The most effective family influences appear to be those that are developed in advance of adolescence. Satisfactory family relationships and climate, emotional support, and moderation in the use of alcohol are influences that appear to delay or diminish adolescent initiation into drug use. These are influences that are developed over a long period of time and attempts to make for their absence by measures such as a sharp increase in parental control of the adolescents' behavior may lead to increased rather than diminished use.

- Peer influence appears to be of a more limited duration than family influence and directed at what are perceived to be issues of more immediate than long-term import. Peer influence is most effective in the first two stages of drug use; the last stage, where the family appears to have more influence, most often comes after the peak of peer influence and also involves use of drugs (e.g., hallucinogens, heroin), which the adolescent perceives as having a greater potential effect on his/her future behavior than either alcohol or marijuana.

- Among interpersonal influences, family and/or peer actual drug use patterns appear to be the strongest influence on adolescent drug use. Parental alcohol use seems to be the strongest interpersonal predictor of adolescent alcohol use, peer marijuana use appears to be the strongest interpersonal predictor of marijuana use, and family and best friend's use of other illicit drugs appear to be among the better interpersonal predictors of adolescent use of these substances.

- Family influence on marijuana use, although small, may be most effective when (1) a strong parent-child relationship exists prior to adolescence and (2) the nature of that relationship is such that parents do not feel that they risk rupturing it by strongly and explicitly stating their position on their child's marijuana use. Although peer influence appears to be strongest with regard to adolescent marijuana use, the potential for family influence is most significant on the level of parent-child relations.

These general conclusions provide a basis for future research in this area.

FUTURE RESEARCH

Developing suggestions for future research in this area is, for several reasons, a difficult task. First, as with the study of any developmental area, the foci of study, in this case families, peers, and adolescents, are constantly changing and thus require sophisticated research methodologies to separate as well as possible the effects of normal development from those of the variables under consideration. Second, adolescent and preadolescent drug use (NIDA 1980) is a relatively recent phenomenon that requires more basic study as well as research concerning family and peer influences upon it. Finally, the drug use field is in a nearly constant state of flux--antidrug parent groups are forming, fad substances come and go, laws are passed and challenged concerning such diverse areas as the criminal status of marijuana use and the constitutional right of merchants to sell drug-related material--all the while making fruitless exercises of research questions that were valid at one point in time.

Nevertheless, the uncertain and novel areas presented by this field and the specific concerns being discussed here do provide the basis for a number of questions that should be considered in the near future:

- How will relative family and peer influence change as age of first drug use drops? There is evidence suggesting that the age of initiation to both alcohol and marijuana use is dropping and often includes preadolescents (NIDA 1980). Since data now suggest that parental modeling is the most important predictor for adolescent initiation into alcohol use, and peer modeling for marijuana use, will the strength of these influences change as they are applied to younger children or will the same patterns be followed, only earlier?

- What are the dynamics of sex differences in family and peer influence on adolescent drug use? While this question has been addressed (e.g., Jessor and Jessor 1977; Shute 1975; Stone and Shute[7]), there has been little systematic, focused investigation of this important issue. What sex parent has most influence over what sex adolescent, at what age(s), for what drug(s)? What effect does sex of sibling model have? What sex peer has most influence over what sex adolescent, at what age(s), for what drug(s)?

- What cultural, racial, and ethnic differences are there in family and peer influences? There is some evidence to suggest that Native American adolescents, for example, are heavy users of inhalants (Goldstein et al. 1979; Oetting and Goldstein[8]); can family and peer influence contribute to the explanation of this phenomenon? Are peer influences on drug use more salient in some cultures? Family influences?

- Does peer influence on adolescent drug use follow a predictable process? Kandel's findings suggest that a generalized peer influence in the early stages of drug use gives way to the more specific influence of a best friend. Are other behaviors and attitudes influenced in this way or is this limited to drug use? Can these findings be replicated by other longitudinal studies?

- What effect will the activities of antidrug parent groups have on the relative influence of family and peers? Until now, all research on this topic has assumed that family and peer relations will follow traditional paths; the emergence of the parent groups questions that assumption. For example, data presented earlier suggested that very strict parental control over adolescent behavior may increase rather than diminish adolescent drug use. These data assume, however, that this control is carried out in isolated instances, providing the adolescent with "cause" for negative comparison of his/her parents with others and leaving the parents with little support for their actions. What will the result be, however, if large groups of united families take such actions?

- What effects do the developmental crises of parents have on their ability to exercise influence on adolescent drug use? Baumrind (1975, 1980) suggests that many parents, particularly as our society tends toward delayed childbirth, will be experiencing their own midlife crises just at the time their adolescents are being faced with increased peer influence concerning drug use. How do parental and child developmental crises interact? How do parent and adolescent cope with simultaneous difficulties in their lives? Does initiation to adolescent drug use increase as a coping mechanism or is it due to a vacuum of family influence?

- What is the relative persistence of family and peer influence on adolescent drug use? As presented earlier, there are data that suggest that adolescents rely on peer influence for immediate issues and family influence for future, life-oriented issues, and that most significant drug use and the danger of initiation to use is over by the mid-20's. This suggests that family influence may have greater persistence but, as use starts earlier, will this increase the period of peer influence? Are some youths more susceptible to longer periods of family or peer influence?

- How can family and peer influence be optimally used to delay or diminish adolescent initiation to drug use? This question has been addressed a number of times (e.g., Iverson et al. 1978; Capone et al. 1973; Pyle 1977; Rachman and Heller 1976; Ryan and Hettena

1976; Nilsongiebel 1980; Johnson 1980; Smart et al. 1976; Eiseman 1974; Rollin and Arey 1974; Bell 1978) in the context of formal education programs, but has not provided a strong base for future implementation, particularly concerning family influence. The emergent parent groups appear anxious to address this issue and it is here that a coordinated effort by researchers and the interested public may have a significant impact.

The questions noted above are only some of the issues that must be addressed if we are to understand the relative influence of the family and peers with regard to adolescent drug use. The theoretical models developed by the Jessors and by Kandel and her colleagues provide a basis for that research.

FOOTNOTES

[1] Boin, S. Parents unite to fight drug abuse. US J Drug Alcohol Abuse, Miami, Florida, May 1980.

[2] Anonymous. Drogenszene: Eltern Helfen Eltern (Drug Scene: Parents Helping Parents). Mod Med, 7:318-319, 1979.

[3] Glynn, T. Families, drugs and responsive research. Unpublished manuscript, National Institute on Drug Abuse, Division of Research, 1980.

[4] Since there are numerous reports on the work of Kandel and her colleagues that provide rigorous data on family and peer influences on adolescent drug use, these reports will not be listed each time they are referenced. Thus, unless a finding is limited to a specific report, when Kandel is cited as a source, this citation refers the reader to the following reports: Kandel 1973, 1974a,b, 1975a,b, 1978, 1980a,b,c; Kandel and Faust 1975; Kandel et al. 1976a,b, 1978a,b.

[5] Kandel, D. Family Processes in Adolescent Drug Use. Final Report, Grant No. 1-R01-DA 00064, National Institute on Drug Abuse, Division of Research, 1978.

[6] McBride, D. Parental and Peer Influence Upon Adolescent Drug Use. Final Report, Grant No. 1-R01-DA 01073, National Institute on Drug Abuse, Division of Research, 1978.

[7] Stone, C.I., and Shute, R.E. Persuader sex differences and peer pressure effects on attitudes toward drug abuse. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California, 1976.

[8] Oetting, E.R., and Goldstein, G. Native American Drug Use, Ages 12-17. Final Report of Grant No. 1-R01-DA 01054, National Institute on Drug Abuse, Division of Research, 1977.

REFERENCES

Adler, P.T., and Lotecka, L. Drug use among high school students: Patterns and correlates. Int J Addict, 8:537-548, 1973.

Annis, H.M. Patterns of intra-familial drug use. Br J Addict, 69: 361-369, 1974.

Ausubel, D.P., Montemayor, R., and Svajian, P. Theory and Problems of Adolescent Development. New York: Grune and Stratton, 1977.

Bandura, A., and Walters, R.H. Social Learning and Personality Development. New York: Holt, Rinehart, 1963.

Baumrind, D. Current patterns of parental authority. Developmental Psychology Monograph, 4:(Whole No. 1), 1971.

Baumrind, D. Early socialization and adolescent competence. In: Dragastin, S.E., and Elder, G.H., eds. Adolescence in the Life Cycle: Psychological Changes and Social Context. Washington, D.C.: Hemisphere, 1975.

Baumrind, D. New directions in socialization research. Am Psychol, 35:639-652, 1980.

Bell, E.V. Peer mediated approach to drug education. J Drug Educ, 47:283-289, 1978.

Bentler, P.M. Multivariate analysis with latent variables: Causal modeling. Ann Rev Psychol, 31:419-456, 1980.

Bentler, P.M., Lettieri, D.J., and Austin, G., eds. Data Analysis Strategies and Designs for Substance Abuse Research. National Institute on Drug Abuse Research Issues Series, Volume 13, DHEW Pub. No. (ADM)78-389. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1976.

Block, J.R., Goodman, N., Ambellan, F., and Revenson, J. A Self-Administered High School Study of Drugs. Hempstead, NY: Institute for Research and Evaluation, 1974.

Blum, R.H., and Associates. Students and Drugs. San Francisco: Jossey Bass, 1969.

Blum, R.H., and Associates. Horatio Alger's Children. San Francisco: Jossey Bass, 1972.

Bowerman, C.E., and Kinch, J.W. Changes in family and peer orientation of children between 4th and 10th grades. Soc Forces, 37:206-211, 1959.

Bowker, L.H. Student drug use and perceived peer drug environment. Int J Addict, 9:851-861, 1974.

Braucht, G.N., Brakarsh, D., Follingstad, D., and Berry, K.L. Deviant drug use in adolescence: A review of psychosocial correlates. *Psychol Bull*, 79:92-106, 1973.

Brittain, C. Adolescent choices and parent-peer cross pressures. *Am Sociol Rev*, 28:385-391, 1963.

Brook, J.S., Lukoff, I.F., and Whiteman, M. Peer, family, and personality domains as related to adolescents' drug behavior. *Psychol Rep*, 41:1095-1102, 1977.

Burkett, S.R. School ties, peer influence, and adolescent marijuana use. *Pacific Sociol Rev*, 20:181-202, 1977.

Burkett, S.R., and Jensen, E.L. Conventional ties, peer influence, and the fear of apprehension: A study of adolescent marijuana use. *Sociol Q*, 16:522-533, 1975.

Capone, T., McLaughlin, J.H., and Smith, F. Peer group leadership program in drug abuse prevention. *J Drug Educ*, 3:201-245, 1973.

Chein, I., Gerard, D.L., Lee, R.S., and Rosenfeld, E. *The Road to H: Narcotics, Delinquency and Social Policy*. New York: Basic Books, 1964.

Clausen, J.A. Family structure, socialization and personality. In: Hoffman, M.L., and Hoffman, L.W., eds. *Review of Child Development Research II*. New York: Russell Sage Foundation, 1966.

Clausen, J.A., ed. *Socialization and Society*. Boston: Little, Brown, 1968.

Coleman, J.S. *The Adolescent Society*. Glencoe, IL.: Free Press, 1961.

Cooley, C.H. *Social Organization*. New York: Scribner's Sons, 1909.

Curtis, R.L. Parents and peers: Serendipity in a study of shifting reference sources. *Soc Forces*, 52:368-375, 1974.

Douvan, E., and Gold, M. Model patterns in American adolescence. In: Hoffman, L.W., and Hoffman, M.L., eds. *Review of Child Development Research II*. New York: Russell Sage Foundation, 1966.

Edwards, J.N., and Brauburger, M.B. Exchange theory and parent-youth conflict. *J Marriage Fam*, 35:101-107, 1973.

Eiseman, S. An approach to primary prevention of drug abuse among children and youth-parental influence. *J Drug Educ*, 4:27-35, 1974.

Ferguson, P., Lennox, T., and Lettieri, D.J., eds. *Drugs and Family/Peer Influences*. National Institute on Drug Abuse Research Issues Series, Volume 4. DHEW Pub. No. (ADM)77-186. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1974.

Floyd, H.H., and South, D.R. Dilemma of youth: The choice of parents or peers as a frame of reference for behavior. J Marriage Fam, 34:627-634, 1972.

Forslund, M.A., and Gustafson, T.J. Influence of peers and parents and six differences in drinking by high school students. Q J Stud Alcohol, 31:868-875, 1970.

Friedenberg, E.Z. Coming of Age in America: Growth and Acquiescence. New York: Random House, 1963.

Glueck, S., and Glueck, E. Unraveling Juvenile Delinquency. Cambridge, MA: Harvard University Press, 1950.

Goldstein, G., Oetting, E., Edwards, R., and Garcia-Mason, V. Drug use among Native American young adults. Int J Addict, 14:855-860, 1979.

Goode, E. Multiple drug use among marihuana smokers. Soc Prob, 17: 48-64, 1969.

Goode, E. The Marihuana Smokers. New York: Basic Books, 1970.

Goode, E. Sociological aspects of marijuana use. Contemp Drug Prob, 397-445, 1975.

Gorsuch, R.L., and Butler, M.C. Initial drug abuse: A review of predisposing social psychological factors. Psychol Bull, 83:120-137, 1976.

Gottlieb, D., and Ramsey, C. The American Adolescent. Homewood, IL: The Dorsey Press, 1964.

Griffin, B.S., and Griffin, C.T. Marijuana use among students and peers. Drug Forum, 7:155-165, 1978.

Gusfield, J. The structural context of college drinking. In: Maddox, G.L., ed. The Domesticated Drug: Drinking Among Collegians. New Haven, CT: College and University Press, 1970.

Haberman, P.W., Josephson, E., Zanes, A., and Elinson, J. High school drug behavior: A methodological report on pilot studies. In: Einstein, S., and Allen, S., eds. Student Drug Surveys. Farmingdale, NY: Baywood Publishing Co., 1972.

Harbin, H., and Maziar, H. The families of drug users: A literature review. Fam Proc, 14:411-431, 1975.

Hirschi, T. Causes of Delinquency. Berkeley and Los Angeles: University of California Press, 1969.

Hovland, C., Janis, I., and Kelly, H.H. Communication and Persuasion. New Haven: Yale University Press, 1953.

Hochman, J. Marijuana and Social Evolution. Englewood Cliffs, NJ: Prentice-Hall, 1972.

Huba, G.H., Wingard, J.A., and Bentler, P.M. Beginning adolescent drug use and peer and adult interaction patterns. J Consult Clin Psychol, 47:265-276, 1979.

Huba, G.H., and Bentler, P.M. The role of peer and adult models for drug-taking at different stages in adolescence. J Youth Adol, in press.

Huba, G.H., Wingard, J.A., and Bentler, P.M. A longitudinal analysis of the role of peer support, adult models, and peer subcultures in beginning adolescent substance use. Multivariate Behavioral Research, in press.

Hunt, D.G. Parental permissiveness as perceived by offspring and degree of marijuana usage by offspring. Hum Rel, 27:267-285, 1974.

Iverson, D.C., Jurs, S., Johnson, L., and Rohen, R. The effects of an education intervention program for juvenile drug abusers and their parents. J Drug Educ, 8:101-111, 1978.

Jensen, G.F. Parents, peers and delinquent actions: A test of the differential association perspective. Am J Sociol, 78:562-575, 1972.

Jessor, R. Predicting time of onset of marijuana use: A developmental study of high school youth. J Consult Clin Psychol, 44:125-134, 1976.

Jessor, R., Collins, M.I., and Jessor, S.L. On becoming a drinker: Social-psychological aspects of an adolescent transition. In: Seixas, F.A., ed. Nature and Nurture in Alcoholism. Annals of the New York Academy of Sciences, Vol. 197. New York: Scholastic Reprints, 1972.

Jessor, R., and Jessor, S.L. Adolescent development vs. the onset of drinking: A longitudinal study. Q Stud Alcohol, 36:27-51, 1975.

Jessor, R., and Jessor, S.L. Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth. New York: Academic Press, 1977.

Jessor, R., Jessor, S.L., and Finney, J. A social psychology of marijuana use: Longtitudinal studies of high school and college youth. J Person Soc Psychol, 26:1-15, 1973.

Johnson, B.D. Marihuana Users and Drug Subcultures. New York: Wiley, 1973.

Johnson, D.W. Constructive peer relationships, social development, and cooperative learning experiences: Implications for the prevention of drug abuse. J Drug Educ, 49:7-24, 1980.

Johnston, L., Bachman, J.G., and O'Malley, P.M. *Highlights from the Class of '78: Behaviors, Attitudes, and Recent National Trends.* National Institute on Drug Abuse. DHEW Pub. No. (ADM)79-878. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1979.

Johnston, L., Bachman, J.G., and O'Malley, P.M. *Drugs and the Nation's High School Students: Five Year National Trends.* National Institute on Drug Abuse. DHEW Pub. No. (ADM)80-930. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1980.

Kandel, D. Adolescent marihuana use: Role of parents and peers. *Science*, 181:1067-1070, 1973.

Kandel, D. Inter- and intra-generational influences on adolescent marijuana use. In: Bengston, V., and Laufex, R., eds. Special issue on "Generations and Social Change." *J Soc Issues*, 30:107-135, 1974a.

Kandel, D. Interpersonal influences on adolescent illegal drug use. In: Josephson, E., and Carroll, E., eds. *Drug Use: Epidemiological and Sociological Approaches*. Washington, D.C.: Hemisphere, 1974b.

Kandel, D. Some comments on the relationship of selected criteria variables to adolescent illicit drug use. In: Lettieri, D., ed. *Predicting Adolescent Drug Abuse: A Review of Issues, Methods and Correlates*. Rockville, MD: National Institute on Drug Abuse, 1975a.

Kandel, D. Stages in adolescent involvement in drug use. *Science*, 190:912-914, 1975b.

Kandel, D. Convergences in prospective longitudinal surveys of drug use in normal populations. In: Kandel, D., ed. *Longitudinal Research in Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-John Wiley, 1978.

Kandel, D. Developmental stages in adolescent drug involvement. In: Lettieri, D., ed. *Theories of Drug Abuse*. National Institute on Drug Abuse Research Monograph Series, Vol. 30. DHHS Pub. No. (ADM)80-967. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1980a.

Kandel, D. Drug and drinking behavior among youth. In: Inkeles, A., Coleman, J., and Turner, R.H., eds. *Ann Rev Sociol*, 6:1980b.

Kandel, D. Another look at convergences in prospective longitudinal surveys of drug use in normal populations. In: Robins, L.N., ed. *Psychosocial Epidemiology, Vol. 7, Drug Use*, World Health Organization, in press, 1980c.

Kandel, D., and Faust, R. Sequences and stages in patterns of adolescent drug use. *Arch Gen Psychiatry*, 32:923-932, 1975.

Kandel, D., and Lesser, G.S. *Youth in Two Worlds*. San Francisco: Jossey-Bass, 1972.

Kandel, D., Kessler, R., and Margulies, R. Adolescent initiation into stages of drug use: A developmental analysis. In: Kandel, D., ed. *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere-John Wiley, 1978a.

Kandel, D., Kessler, R.C., and Margulies, R.S. Antecedents of adolescent initiation into stages of drug use: A developmental analysis. *J Youth Adol*, 7:13-40, 1978b.

Kandel, D., Single, E., and Kessler, R. The epidemiology of drug use among New York State high school students: Distribution, trends and change in rates of use. *Am J Public Health*, 66:43-53, 1976a.

Kandel, D., Treiman, D., Faust, R., and Single, E. Adolescent involvement in illicit drug use: A multiple classification analysis. *Soc Forces*, 55:438-458, 1976b.

Krohn, M.D. An investigation of the effect of parental and peer associations on marijuana use: An empirical test of differential association theory. In: Reidel, M., and Thornberry, T.P., eds. *Crime and Delinquency: Dimensions of Deviance*. New York: Praeger, 1974.

Larsen, L.E. The influence of parents and peers during adolescence: The situation hypothesis revisited. *J Marriage Fam*, 34:67-74, 1972.

Larsen, L.E. An examination of the salience hierarchy during adolescence: The influence of the family. *Adolescence*, 9:317-332, 1974.

Lavenhar, M.A., Wolfson, E.A., Sheffet, A., Einstein, S., and Louria, D.B. A survey of drug abuse in six suburban New Jersey high schools. In: Einstein, S., and Allen, S., eds. *Student Drug Surveys*. Farmingdale, NY: Baywood Publications, 1972.

Lawrence, T.S., and Vallerman, J.O. Correlates of student drug use in a suburban high school. *Psychiatry*, 37:129-136, 1974.

Lettieri, D.J., Sayers, M., and Pearson, H. *Theories on Drug Abuse*. National Institute on Drug Abuse Research Monograph Series, Volume 30. DHHS Pub. No. (ADM)80-967. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1980.

Lewin, K. *Principles of Topological and Vector Psychology*. New York: McGraw-Hill, 1936.

Maccoby, E.E. The development of moral values and behavior in childhood. In: Clausen, J.S., ed. *Socialization and Society*. Boston: Little, Brown, 1968.

Maddox, G.L., ed. *The Domesticated Drug: Drinking Among Collegians*. New Haven, CT: College and University Press, 1970.

Manatt, M. *Parents, Peers and Pot*. National Institute on Drug Abuse Prevention Publication. DHEW Pub. No. (ADM)79-812. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1979.

McKillip, J., Johnson, J.E., and Petzel, T.E. Patterns of correlates of drug use among urban high school students. *J Drug Educ*, 3:1-12, 1973.

Mead, G.H. *Mind, Self and Society*. Chicago: University of Chicago, 1934.

Mischel, W. Toward a cognitive social learning reconceptualization of personality. *Psychol Rev*, 80:252-283, 1973.

National Institute on Drug Abuse. *Marijuana and Health* Eighth Annual Report to the U.S. Congress. DHHS Pub. No. (ADM)80-945. Washington, D.C.: Supt. of Docs., Govt. Print. Off., 1980.

Nilsongiebel, M. Peer groups help prevent dependence among youth in the Federal Republic of Germany. *Int J Health Educ*, 20-24, 1980.

O'Donnell, J.A., Voss, H.L., Clayton, R.R., and Room, R. *Young Men and Drugs. A Nationwide Survey*. National Institute on Drug Abuse Monograph 5. DHEW Pub. No. (ADM)76-311. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1976.

Pyle, K.R. Developing a teen-peer facilitator program. *School Counselor*, 24:278-281, 1977.

Rachman, A.W., and Heller, M.E. Peer group psychotherapy with adolescent drug abusers. *Int J Group Psychother*, 26:373-384, 1976.

Rollin, S.A., and Arey, J. A community action drug abuse program: The parent helper. *J Drug Issues*, 4:176-180, 1974.

Rosen, B.C. Conflicting group membership: A study of parent-peer group cross-pressures. *Am Sociol Rev*, 20:151-161, 1955.

Rosenberg, C.M. Determinants of psychiatric illness in young people. *Br J Psychiatry*, 115:907-915, 1969.

Rotter, J.B. Generalized expectancies for internal versus external control of reinforcement. *Psychol Monogr*, 80:(1)(Whole No. 609), 1966.

Russell, J.S. Composite patterns of drug use. In: Einstein, S, and Allen, S., eds. *Student Drug Surveys*. Farmingdale, NY: Baywood Publications, 1972.

Ryan, W.P., and Hettena, C. Project youth: An approach to drug abuse. *Elem School Guid Counsel*, 10:270-278, 1976.

Sadava, S.W. Initiation to cannabis use: A longitudinal social psychological study of college freshman. *Can J Behav Sci*, 5:371-384, 1973a.

Sadava, S.W. Patterns of college student drug use: A longitudinal social learning study. *Psychol Rep*, 33:75-86, 1973b.

Sadava, S.W., and Forsyth, R. Turning on, turning off and relapse: Social psychological determinants of status change in cannabis use. *Int J Addict*, 12:509-528, 1977.

Scherer, S. Self-reported parent and child drug use. *Br J Addict*, 68:363-361, 1973.

Seldin, N. The family of the addict: A review of the literature. *Int J Addict*, 7:97-107, 1972.

Shute, R.E. The impact of peer pressure on the expressed drug attitudes of male college students. *Am J Drug Alcohol Abuse*, 2:231-243, 1975.

Shibuya, R.R. Categorizing drug users and nonusers on selected social and personality variables. *J School Health*, 44:442-444, 1974.

Smart, R.G., and Fejer, D. Drug use among adolescents and their parents: Closing the gap in mood modification. *J Abnorm Soc Psychol*, 79:153-160, 1972.

Smart, R.G., Bennett, C., and Fejer, D. Controlled study of a peer group approach to drug education. *J Drug Educ*, 6:305-311, 1976.

Solomon, D. Adolescent's decisions: A comparison of influence from parents with that from other sources. *J Marriage Fam Liv*, 23:393-395, 1961.

Stanton, M.D. The family and drug misuse: A bibliography. *Am J Drug Alcohol Abuse*, 5:151-170, 1978.

Stanton, M.D. Drugs and the family: A review of the literature. *Marriage Fam Rev*, 2:1-10, 1979.

Stone, L.H., Miranne, A.C., and Ellis, G.J. Parent-peer influence as a predictor of marijuana use. *Adolescence*, 14:115-122, 1979.

Suchman, E. The "hang-loose" ethic and the spirit of drug use. *J Health Soc Behav*, 9:146-155, 1968.

Sutherland, E., and Cressey, D. *Criminology*. New York: Lippincott, 1970.

Tec, N. Family and differential involvement with marijuana: A study of suburban teenagers. *J Marriage Fam*, 32:656-664, 1970.

Tec, N. Differential involvement with marijuana and its sociocultural context: A study of suburban youths. *Int J Addict*, 7:655-670, 1972a.

Tec, N. Some aspects of high school status and differential involvement with marijuana: A study of suburban teenagers. *Adolescence*, 6:1-28, 1972b.

Tec, N. The peer group and marijuana use. *Crime and Delinquency*, 18: 298-309, 1972c.

Tec, N. *Grass is Green in Suburbia*. Roslyn Heights, NY: Libra Publishers, Inc., 1974a.

Tec, N. Parent-child drug abuse: Generational continuity or adolescent deviancy? Adolescence, 9:351-364, 1974b.

Wechsler, H., and Thum, D. Drug use among teenagers: Patterns of present and anticipated use. Int J Addict, 8:909-920, 1973a.

Wechsler, H., and Thum, D. Teenage drinking, drug use, and social correlates. Q J Stud Alcohol, 34:1220-1227, 1973b.

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The Delinquency and Drug Use Relationship Among Adolescents: A Critical Review

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The primary purpose of this paper is to review what is now known about the delinquency-drug use relationship among adolescents. A related task is to use the review to target aspects of the delinquency-drug use relationship that require further research scrutiny and more elaboration.

Most of the research on the crime-drug nexus has dealt with drug use among criminal offenders (cf., Barton 1976; Eckerman et al. 1971; Kozel et al. 1972; Weissman et al. 1974) and criminality among narcotics addicts (cf., Inciardi and Chambers 1972; Voss and Stephens 1973; Ball et al. 1975; Nurco and DuPont 1977; Inciardi 1979). In the recent past a number of reviews of the crime-drug relationship have been published, usually with a special emphasis on narcotics use (Chambers 1974; Cushman 1974; Gould 1974; Greenberg and Adler 1974; Research Triangle Institute 1976; Weissman 1979; Gandossy et al. 1980).

The story with regard to the delinquency-drug use relationship among adolescents is different. While there are a multitude of studies that examine the etiology of adolescent drug use or juvenile delinquency and some that focus on both drug use and delinquency as separate indices of deviance, there are relatively few studies that attempt to understand how delinquency and drug use are related to each other. However, these latter studies have been thoroughly reviewed by Elliott and Ageton (1976b). They divided the extant literature into "studies of officially defined drug users and delinquents" (Chein 1964; Chein et al. 1964; Weitzner et al. 1973; Friedman and Friedman 1973a) and "studies involving normal youth populations" (Robins and Murphy 1967; Jacoby et al. 1973; Friedman and Friedman 1973b; Goode 1973; Johnston 1973; O'Donnell et al. 1976; Jessor and Finney 1973; Jessor 1976; Gold and Reimer 1974; Elliott and Ageton 1976a; Hindelang and Weiss 1972).

It would be redundant to review in detail each of the studies reviewed by Elliott and Ageton (1976b). Therefore, in the remainder of this paper findings and conclusions from the studies reviewed by Elliott and Ageton will be used only to highlight the points being made.

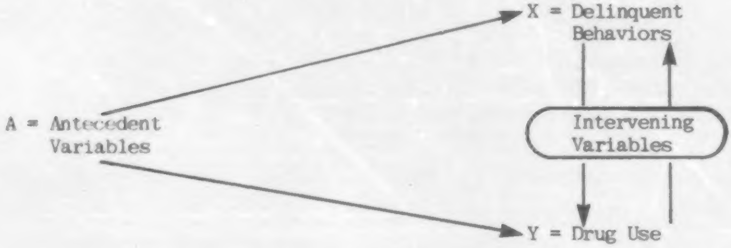
Before the substantive findings and conclusions are reviewed, it would be useful to delineate the methodological and scientific bases from which the delinquency-drug use relationship should be examined. In the next section a model of the relationship is presented along with a discussion of the criteria of causality that should be applied to this relationship.

THE DELINQUENCY-DRUG USE RELATIONSHIP: A METHODOLOGICAL MODEL

The methodological model that is most appropriate for examining the delinquency-drug use relationship (Clayton and Tuchfeld, unpublished) is based on the multivariate "elaboration" approach of Lazarsfeld (1955), Hyman (1955), and Rosenberg (1968) at the nonparametric level and the causal modeling approach of Blalock (1971), Heise (1975), Joreskog (1970), and Duncan (1975) at the parametric level.

Model A

The Elaboration Model of the Delinquency-Drug Use Relationship Among Adolescents



Source: Clayton, R.R., and Tuchfeld, B.S. The drug-crime debate: Obstacles to understanding the relationship. Unpublished.

This model is based on the probabilistic concept and criteria of causality accepted by virtually all social scientists. Hirschi and Selvin (1967) identified the three essential criteria of causality as follows:

- The predictor and effect variables must be correlated (i.e., statistical association).
- The predictor variable must be antecedent to the effect variable in time-order occurrence. Because social scientists usually aggregate data for individuals according to group characteristics (e.g., gender, ethnicity, etc.), the predictor variable must be antecedent to the effect variable in the "majority" of cases, not necessarily in all cases.

- It must be demonstrated that the observed statistical correlation between the predictor and effect variables does not result from both being "caused" by variables antecedent to both (i.e., the zero-order relationship must be tested for "spuriousness" by partialing out the influence of antecedent variables).

Model A has several component parts that deserve attention. First, there are two-headed arrows between delinquency and drug use. This implies that (a) drug use could be antecedent to and predictive of delinquency and (b) delinquency could be antecedent to and predictive of drug use. In either case, the first order of research business is to establish the degree of association between the two variables.

Second, the two-headed arrows imply that one must establish the predominant temporal order among drug-using and delinquency behaviors. There are several meanings of temporal order found in the literature on the delinquency-drug use relationship. The most common meaning focuses on "onset." Does age at first delinquent act predate age at first drug use, or vice versa? The answer to this question usually hinges on whether the researcher is interested only in illicit drug use, in which case delinquency is usually the predictor and illicit drug use the effect variable. If the researcher has data on first use of alcohol or cigarettes or first experience with alcohol intoxication, in addition to onset of use of illicit drugs, the temporal sequence might be: first use of licit drugs to first delinquent act to first use of illicit drugs. A second and less common meaning of temporal order involves charting the dynamic intersection of drug-using and delinquent behaviors over time. For example, the research question using this meaning of temporal order is: Among persons who have already engaged in delinquent acts, does initiation of drug use increase the frequency, seriousness, and variety of delinquent activities, and does this lead to greater drug involvement, and so on? While both meanings of temporal sequencing are relevant to the delinquency-drug relationship, design and other considerations have led most researchers to use the first meaning, onset events by onset events.

Determining whether a relationship is spurious is the most difficult criterion of causality to establish beyond reasonable doubt. It is also the criterion that is least understood. In model A the delinquency-drug use relationship is tested for spuriousness by controlling on or partialing out the effects of variables that are antecedent to and possibly causal of both drug use and delinquency. This requires that (a) one provide evidence that these variables are, in fact, antecedent to both X and Y, and (b) that the partial correlation coefficients (XY: a_1, a_2, a_3 ... a_n) reduce to zero or become statistically nonsignificant.

The last component of model A that should be discussed is located in the oval sphere between delinquency and drug use. These are variables that intervene temporally and/or theoretically between X and Y. A statistical control on the intervening variable(s) should produce a zero or statistically nonsignificant partial correlation coefficient. If this occurs it does not mean that X is not a cause of Y. Instead, it means that the influence of X on Y is indirect, not direct, and that knowledge of the variables intervening between X and Y enhances understanding of the XY relationship. Stated differently, evidence of intervening variables elaborates understanding of the XY causal chain.

There is a great deal of variation in the methodological rigor among the studies that have dealt with the delinquency-drug use relationship. Predictably, on that score, more confidence can be placed in the findings from studies conducted in the recent as opposed to distant past. Findings from studies that are based on normal populations will likewise be more credible than those conducted on officially identified delinquents or drug users.

DELINQUENCY AND DRUG USE AMONG ADOLESCENTS: ARE THEY CORRELATED?

The first criterion of causality concerns the presence of a relationship: Are delinquency and drug use correlated? In a general way, Jessor's observation about marijuana provides an answer to this question. "The most ubiquitous generalization that can be made is that marijuana use, far from being an isolated behavior, is generally part of a larger behavioral pattern involving the use of other drugs and engaging in a variety of other unconventional or nonconforming actions such as delinquency, sexual experience, political activism, and attenuated academic performance" (Jessor 1979, p. 346). At a more specific level, Elliott and Ageton (1976b) found some association between delinquency and drug use in every study they reviewed. The only exception to this was a study by Scott and Wilcox (1965) that focused exclusively on amphetamines. Overall, the delinquency-drug use relationship is general and seems to hold for both serious and nonserious delinquency.

DELINQUENCY AND DRUG USE AMONG ADOLESCENTS: WHAT IS THE PREDOMINANT TEMPORAL ORDER?

In the broader literature on the crime-drug nexus there is consensus on the question of temporal order. Most studies of opiate addicts reveal that criminal involvement precedes use of narcotics and addiction (cf., Winick 1974; Lukoff 1974; McGlothlin et al. 1978; Nurco and DuPont 1977). The only recent study of addicts that found minimal criminal activity prior to first use of narcotics was conducted among residents at the Lexington Hospital by Voss and Stephens (1973).

Inciardi's (1979) study of apprehended and unapprehended criminals in a sample of 356 active heroin users from Miami shows that onset of delinquency precedes use of illicit drugs, including marijuana. Data on the median ages of initiation into various stages of drug/crime careers for this sample are found in table 1.

Table 1

Drug/Crime Careers: Median Age at Initiation for a Sample of Active Heroin Addicts (Inciardi 1979)

Drug/Crime Events	Median Age of Initiation	
	Males	Females
First alcohol use	12.8	13.8
First alcohol intoxication	13.3	13.9
First criminal activity	15.1	15.9
First drug abuse	15.2	15.2
First marijuana use	15.5	15.4
First arrest	17.2	18.3
First barbiturate use	17.5	17.0
First heroin use	18.7	18.2
First continuous heroin use	19.2	18.4

Adapted from Inciardi, J.A. Heroin use and street crime. *Crime and Delinquency*, 25:335-346, 1979.

While delinquency precedes illicit drug use, use of alcohol and first alcohol intoxication are clearly antecedent to delinquency. In fact, there is a 2-year average hiatus between first alcohol intoxication and first criminal activity for both males and females who later become heroin addicts. It is probably safe to assume that alcohol intoxication episodes occurred with some frequency for these individuals prior to commission of their first criminal act. Another safe assumption is that these alcohol intoxication episodes usually occur as group events, suggesting that (a) it is important to consider alcohol use in any examination of the delinquency-drug use relationship and (b) alcohol may be a key factor in the movement of youth from the influences of family for conventionality toward the influences of peers for unconventional conduct.

In his review of the etiological aspects of drug abuse, Nurco underscored the important role of alcohol in transition proneness:

> ...addicts appear to begin drinking before their age and social class peers in the general population--that is, addicts might be called "norm breakers." Not only do they appear to be more deviant than the general population, but they prove this by engaging in the "marginally acceptable" before others do. (Nurco 1979, p. 315)

Elliott and Ageton (1976b) reach the following conclusion about temporal order:

> There is considerable consensus that involvement in delinquent behavior precedes any use of illicit drugs. This generalization clearly does not apply to alcohol use but does apply to the total range of illicit drugs investigated.... There is consistent, compelling evidence that delinquency precedes illicit drug use.

THE DELINQUENCY-DRUG USE RELATIONSHIP: IS IT SPURIOUS?

There is also a consensus that the delinquency-drug relationship among adolescents is spurious; that is, the observed correlation between these two variables washes out when variables antecedent to and causally related to both delinquency and drug use are statistically controlled.

Goode (1973), in a study conducted for the Marijuana Commission, said that his findings strongly support the view that marijuana use by itself is not related in any meaningful way to criminal behavior. He claims that the spurious model seems to be a far more accurate description of the relationship between marijuana use and criminal behavior than the causal model.

Elliott and Ageton (1976a) reached the same conclusion in a cross-sectional survey of probability samples of over 8,000 youths 11 to 17 years old drawn from 7 cities. They compared their findings from this study of "normal" youths with those obtained when only those youths reporting substantial involvement in delinquency were examined (n = 1,920). Summarizing the findings in their review article, Elliott and Ageton (1976b) say:

> The results of this study which involved surveys of large normal youth populations suggest that the association between marijuana use and income-producing or violent crimes is spurious and that marijuana use is normative for youth involved in any significant amount of delinquency. The same finding was observed for alcohol use. At the same time, these results suggest that the use of hard drugs and the sale of marijuana or hard drugs is associated with both income-producing and violent crimes, and that this relationship is not explained by one's general involvement in delinquency.

Johnston et al. (1978) used a national probability sample of young men studied at five points in time to examine the delinquency-drug use relationship. While the ages covered were 15 to 23, items concerned with initial age at onset of drug use did not appear in the schedule until the fourth data collection. At this time, most of the respondents had been out of high school for a year. At this point, they were asked to recall their drug use during the year prior to graduation, when they were 17 to 18 years old, and for the year after graduation when they were 18 to 19 years old. Similar data on drug use were obtained when the respondents were 19 to 22 years old (fifth wave) and for the year immediately prior to the fifth point of data. Elliott and Ageton (1976b) note: "It should be remembered, however, that by the time the initial drug measures were obtained, the cohort was approximately 19, recalling drug use 2 years earlier when they were 17. The initial onset of drug use was probably missed for a large proportion of sample subjects."

Johnston et al. (1978) used a composite measure of drug use involving marijuana, other drug use (not including heroin), and heroin use, with both a frequency and a seriousness dimension. Measures of delinquency were gathered in all five waves yielding two indices: a Theft and Vandalism Index (e.g., items on arson, car theft, theft of an expensive car part, school vandalism, theft of an inexpensive car part, theft of objects worth over $50, trepassing, shoplifting, and theft of objects worth under $50); and an Index of Interpersonal Aggression (e.g., hit an instructor or supervisor, armed extortion, injurious assault, gang fight, and fight at school or work).

Their conclusions relate specifically to the question of whether the delinquency-drug use relationship is spurious. The finding from this study is especially important because the sample is from a normal population, it is representative of a nationwide cohort, and the data are from a longitudinal study of the same subjects.

Johnston et al. (1978) state:

> What we do conclude from these explorations is that nonaddictive use of illicit drugs does not seem to play much of a role in leading users to become the more delinquent people we know them to be on the average. The reverse kind of causation seems considerably more plausible, that is, that delinquency leads to drug use. For example, we think it quite possible that delinquents who, because of their delinquency, become part of a deviant peer group are more likely to become drug users because drug use is likely to be an approved behavior in such a peer group. We also suspect that the correlation between delinquency and drug use stems not only from such environmental factors but also from individual differences in personality. Both delinquency and drug use are deviant behaviors, and therefore both are more likely to be adopted by individuals who are deviance prone. The fact that other forms of delinquency tended to precede drug use (at least in this cohort) may simply reflect the fact that proneness toward deviance is expressed through different behaviors at different ages. Further, for this cohort, the notion of using illicit drugs at all was just rising to consciousness among these young people as they passed through high school. Studies of a more recent class cohort would undoubtedly show less precedence of drug use by other forms of delinquency because the average age of first drug use has declined markedly.

> So, while, we have relatively little direct evidence from this study to buttress these alternate hypotheses for explaining the connection between nonaddictive drug use and other forms of delinquency, we intuitively find them most convincing at present. Certainly the hypothesis that the association exists because such drug use somehow causes other kinds of delinquency has suffered a substantial, if not mortal, blow. (Johnston et al. 1978, p. 156)

The studies by Elliott and Ageton (1976a) and by Johnston et al. (1978) are in agreement--the delinquency-drug use relationship is spurious. However, whether the idea that the relationship is causal has suffered a "substantial, if not mortal, blow," is still debatable for several reasons. First, Johnston et al. (1978) focused only on illicit drug use, ignoring the possible role of alcohol. They state: "Neither would we suggest that alcohol, which was not investigated but which is certainly a drug, does not lead to criminal or violent behavior" (p. 155). Second, there is solid evidence that marijuana use is strongly related to drug sales (see Single and Kandel 1978; Johnson 1973; Clayton and Voss, in press), and thus may be related to subsequent delinquency/criminality and use of other illicit drugs, both directly and indirectly. If this is so, the marijuana use-delinquency/criminality relationship may be elaborated by controls on drug sales. Third, neither the Elliott and Ageton (1976a) study nor the study of Johnston et al. (1978) tested the delinquency-drug use relationship by controlling on variables antecedent to both that might be causally related to them in a theoretical sense. In other words, these two studies are essentially atheoretical. In order to address in this paper the issue of spuriousness of the delinquency-drug use relationship and to determine if the conclusion that it is spurious is still debatable, a correlation matrix from an unpublished paper by Krohn and Massey (1979)[1] was analyzed.

KROHN AND MASSEY (1979): SOCIAL BONDING THEORY, DRUG USE, AND DELINQUENT BEHAVIOR

Krohn and Massey (1979) gathered data via self-administered questionnaires from a representative sample of male and female students (n = 3,065) in grades 7 through 12 in six communities within three midwestern states. Four forms of deviance were measured and used as independent indices.

- Alcohol/Marijuana Use. Self-reported frequency with which these two drugs were used.

- Hard Drug Use. Self-reported frequency with which stimulants, depressants, psychedelics, and narcotics were used.

- Minor Delinquency. Self-reported involvement in (a) running away from home, (b) sexual intercourse, (c) truancy, and (d) school suspension and/or expulsion.

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[1] Since Dr. Clayton's paper was written, a paper based upon the Krohn and Massey study has been published as: Krohn, Marvin D., and Massey, James L. Social control and delinquent behavior: An examination of the elements of the social bond. Sociological Quarterly, 21:529-544, autumn 1980.

- Serious Delinquency. Self-reported involvement in (a) vandalism, (b) motor vehicle theft, (c) assault, (d) use of or threatening to use a weapon, (e) theft of things worth $2 to $50, and (f) theft of things worth over $50.

The primary purpose of the study was to test the relative efficacy of three major concepts from Hirschi's (1969) social bonding theory of delinquency: attachment, commitment, and belief.

- Attachment was measured by scales tapping the components of (a) supervision, (b) praise, (c) discouragement, (d) closeness, and (e) satisfaction. The questions composing these scales were similar to those used by Hirschi and yielded indices of Maternal Attachment, Paternal Attachment, and Peer Attachment. Krohn and Massey (1979) say: "The item to scale correlations indicate that all three scales have a high degree of internal reliability." (p. 10)

- Commitment was measured on four dimensions: (a) grade point average, and by questions similar to Hirschi's dealing with (b) education aspirations and (c) career aspirations. In addition, Krohn and Massey created a (d) commitment scale by asking the students to indicate how important participating in each of the following activities is to them: school work, athletics, musical groups, pep groups, other school activities, church activities, and community clubs.

- Belief was measured by three items concerning the degree of agreement or disagreement respondents have with parental norms (i.e., parents' morals are good for me), legal norms (i.e., moral duty to obey the law), and the value of education (i.e., school learning helps find job).

Thus, Krohn and Massey (1979) have a total of 10 predictor variables representing the three major concepts from social bonding theory. They used these variables to predict alcohol/marijuana use, use of hard drugs, minor delinquency, and serious delinquency. While they have the data to do so, neither Krohn and Massey (1979), nor Akers et al. (1979), nor Krohn et al. (undated) seem to have examined the efficacy of these variables in elaborating relationships among the indices of deviance.

Krohn and Massey did provide a zero-order correlation matrix (see table 2 for Pearson r values) for relationships among the three attachment variables, the four commitment variables, the three belief variables, and the four indices of deviance (alcohol/marijuana use, use of hard drugs, minor delinquency, and serious delinquency). With model A and Hirschi and Selvin's (1967) three criteria of causality as guides, this matrix will be analyzed using partial correlation and multiple regression techniques. This analysis will address a basic research question: Is the delinquency-drug abuse relationship among adolescents really spurious?

Table 2

Zero-Order Corrolation Matrix of the Independent and Dependent Variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}
X_1														
X_2	.518													
X_3	.167	.104												
X_4	.287	.242	.153											
X_5	.017	.013	.107	.029										
X_6	.038	.052	.017	.138	.009									
X_7	.243	.184	.096	.245	-.077	.015								
X_8	.407	.379	.046	.234	.015	.074	.151							
X_9	.234	.197	.026	.282	.027	.092	.166	.355						
X_{10}	.181	.210	.089	.307	-.041	.130	.224	.230	.275					
X_{11}	-.309	-.266	.009	-.352	.007	-.045	-.272	-.337	- 308	-.242				
X_{12}	-.245	-.214	-.028	-.286	-.040	.033	-.211	-.209	- 243	-.203	.491			
X_{13}	-.307	-.247	.000	-.321	.019	-.022	-.325	-.269	- 287	-.236	.503	.424		
X_{14}	-.277	-.205	-.097	-.267	-.006	.012	-.265	-.251	- 258	-.171	.477	.378	.474	

X1=Maternal Attachment Scale
X2=Paternal Attachment Scale
X3=Peer Attachment Scale
X4=Commitment Scale
X5=Educational Aspirations
X6=Career Aspiration
X7=Grade Point Average

X8=Parents morals are good enough for me
X9=Moral Duty to obey the law
X10=School learning helps find job
X11=Alcohol/Marijuana Scale
X12=Hard Drugs Scale
X13=Minor Delinquency Scale
X14=Serious Delinquency Scale

Krohn, Marvin D., and Massey, James L. Social control and delinquent behavior: An examination of the elements of the social bond. Sociological Quarterly, 21:529-544, 1980. © Sociological Quarterly.

ASSOCIATION AMONG FOUR INDICES OF DEVIANCE: THE KROHN AND MASSEY (1979) STUDY

The data in table 2 indicate the presence of strong relationships among the four measures of deviance.

- Alcohol/Marijuana--Hard Drugs (r = .491)
- Alcohol/Marijuana--Minor Delinquency (r = .593)
- Alcohol/Marijuana--Serious Delinquency (r = .477)
- Hard Drugs--Minor Delinquency (r = .424)
- Hard Drugs--Serious Delinquency (r = .378)
- Minor Delinquency--Serious Delinquency (r = .474)

It is clear that delinquency and drug use are associated and thus meet the first criterion of causality. The average correlational value among the four measures of deviance is .473. Given the conservative nature of the Pearson r measure, this is quite high. The average correlational value among the three attachment indices is .263 compared to a value of .086 among the four commitment items and .287 among the three belief items.

TEMPORAL ORDER AMONG THE FOUR INDICES OF DEVIANCE: THE KROHN AND MASSEY (1979) STUDY

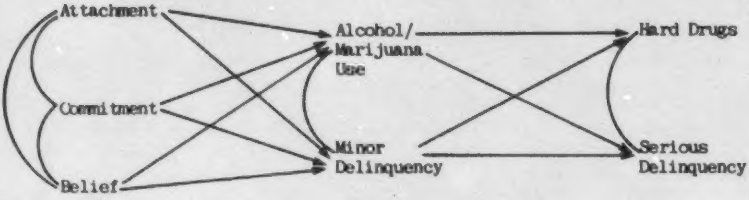
Demonstrating association between delinquency and drug use was a simple task. However, establishment of temporal ordering among the four measures of deviance, the second criterion of causality, will be more difficult since the paper by Krohn and Massey (1979) and other papers based on these data (Akers et al. 1979; Krohn et al. undated) provide no information on the question of time-order of occurrence. Another complicating factor is that the data are cross-sectional. Therefore, any temporal ordering imposed on these variables must be logically and empirically defensible.

We can assume with confidence that minor delinquency and alcohol/marijuana use are both antecedent to use of hard drugs and serious delinquency. Since the data are cross-sectional, it is somewhat more difficult to say with certainty where the social bonding variables should be temporally located with respect to alcohol/marijuana use and minor delinquency. However, given the relatively young ages (12 to 17 years old) of the respondents and the fact that the social bonding items reflect attachments, commitments, and beliefs that are probably stable over time we have assumed that the theory-based items are antecedent to all four measures of deviance. Finally, it would be unwise to posit a time-order among (a) alcohol/marijuana use and minor delinquency or (b) use of hard drugs and serious delinquency without further data analysis. Therefore, at this point we are dealing with the relationships implied by model B.

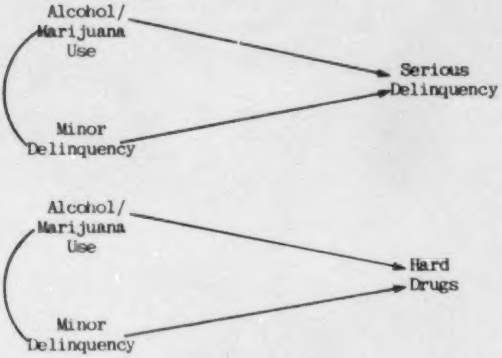
With partial correlation techniques we can test some of the assumptions about the temporal order among alcohol/marijuana use and minor delinquency and serious delinquency and hard drug use.

Model B

A Social Bonding Model of Delinquency-Drug Use Relationship Among Adolescents: The Krohn-Massey Study


Attachment
Alcohol/ Marijuana Use
Hard Drugs
Commitment
Minor Delinquency
Serious Delinquency
Belief

Four Variables Found in Model B


Alcohol/ Marijuana Use
Serious Delinquency
Minor Delinquency
Alcohol/ Marijuana Use
Hard Drugs
Minor Delinquency

The zero-order and partial correlations among these variables are:

- Alcohol/Marijuana--Serious Delinquency (r = .477), controlling on Minor Delinquency produces a partial r of .276, a reduction of .201.

- Minor-Delinquency--Serious Delinquency (r = .474), controlling on Alcohol/Marijuana yields a partial r of .270, a reduction of .204.

- Alcohol/Marijuana--Hard Drugs (r = .491), partial r controlling on Minor Delinquency equals .329, a reduction of .162.

- Minor Delinquency--Hard Drugs (r = .424), partial r controlling on Alcohol/Marijuana equals .189, a reduction of .235.

Simply put, these findings do not allow us to unambiguously assign temporal ordering to these four indices of deviance. Therefore, for the present we will assume that the blocking of these four variables as seen in model B is a fair reflection of reality for this sample.

Another way of attempting to unravel the time-order among these variables is to regress serious delinquency and use of hard drugs against all variables possibly antecedent to them in model B. It is likely that the standardized partial betas will be higher for those variables most proximate to the dependent variable. It should be noted that the standardized partial betas are synonymous with the unstandardized beta values when a matrix without means and standard deviations constitutes the input.

As the data in table 3 indicate, the order in which alcohol/marijuana use and minor delinquency enter the equation is similar for both serious delinquency and hard drugs. It is clear that alcohol/marijuana use accounts for considerably more of the variance in serious delinquency. It is also clear that the beta for the alcohol/marijuana path to use of hard drugs is considerably stronger than the path from minor delinquency. When the dependent variable is serious delinquency, alcohol/marijuana enter the equation first, but the path from minor to serious delinquency is somewhat stronger. Overall, more than 30 percent of the variance in both serious delinquency and use of hard drugs is explained by all of the predictor variables, although there is a sharp diminution in incremental variance explained after the three behavioral variables enter the equation.

The conclusion that seems best justified, although it is not as clear as one would prefer, is that minor delinquency seems to be marginally more antecedent to alcohol/marijuana use than vice versa. Therefore, model C has been constructed to represent a best guess as to the structure of the relationships among the variables in the Krohn and Massey study.

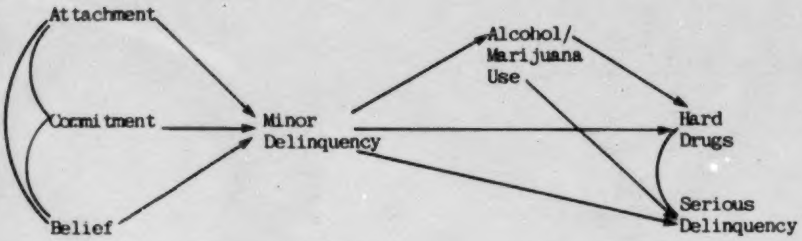
Table 3

Regression of Use of Hard Drugs and Serious Delinquency on 13 Predictor Variables: The Krohn-Massey Study

	Beta	F Value	Cumulative r Square
Dependent Variable = Use of Hard Drugs			
Alcohol/marijuana use	.291	196.877	.241
Minor delinquency	.133	43.815	.268
Serious delinquency	.126	48.061	.284
Commitment scale	-.080	20.979	.291
Career aspiration	.069	19.892	.295
School learning helps find job	-.050	8.920	.298
Educational aspirations	-.046	8.848	.300
Paternal attachment	-.036	3.912	.302
Maternal attachment	-.032	2.775	.302
Grade point average	-.016	.906	.302
Peer attachment	.012	.604	.302
Parents morals are good for me	.016	.770	.303
Moral duty to obey the law	-.014	.646	.303
Dependent Variable = Serious Delinquency			
Alcohol/marijuana use	.212	104.535	.228
Minor delinquency	.231	140.710	.284
Use of hard drugs	.123	48.263	.299
Peer attachment	-.075	23.838	.308
Grade point average	-.072	19.377	.314
Maternal attachment	-.055	8.471	.318
Parents morals are good for me	-.046	6.709	.320
Career aspiration	.035	5.378	.321
Moral duty to obey the law	-.036	4.337	.322
Commitment scale	-.030	2.966	.322
School learning helps find job	.015	.831	.323
Paternal attachment	.011	.342	.323
Educational aspirations		Not in Equation	

Model C

A Revised Model of the Delinquency-Drug Use Relationship Among Adolescents: The Krohn-Massey (1979) Test of Social Bonding Theory



IS THE DELINQUENCY-DRUG USE RELATIONSHIP SPURIOUS?: THE KROHN-MASSEY (1979) STUDY

With the association between delinquency and drug use firmly established and the temporal order tenuously established, it is now possible to test the relationship for spuriousness. It should first be noted that the items designed by Krohn and Massey (1979) to represent the central concepts of Hirschi's (1967) social bonding theory are reliable and are solidly grounded in a widely accepted theory of deviance. In terms of conceptual grounding this test of the delinquency-drug use relationship for spuriousness is somewhat superior to the tests conducted by Elliott and Ageton (1976b) and Johnston et al. (1978).

The data in table 4 indicate unambiguously that Johnston et al. (1978) were not accurate in stating that the "causal" model of the delinquency-drug use relationship "has suffered a substantial, if not mortal, blow." In fact, the data in table 4 indicate that the relationship between minor delinquency and alcohol/marijuana use in the Krohn and Massey study is not spurious. The original relationship ($r = .593$) is not substantially lower in any of the 10 first-order partials. A simultaneous control on all of the 10 antecedent predictor variables produces a 10th order partial r of .458, still statistically significant and significantly different from the zero that would be expected if the original relationship were spurious. While it is true that statistical controls on sociodemographic variables such as age and sex and psychosocial variables such as self-esteem, rebelliousness, and impulsivity were not employed, it is highly unlikely that they would be sufficiently related to both minor delinquency and alcohol/marijuana use to render that relationship spurious.

Table 4

The Minor Delinquency-Alcohol/Marijuana Relationship: Testing for Spuriousness with the Krohn-Massey Study

	Zero-Order r	Partial r
Minor Delinquency-Alcohol/Marijuana Use	.593	
Attachment		
Maternal attachment		.550
Paternal attachment		.565
Peer attachment		.593
Commitment		
Commitment scale		.542
Educational aspirations		.593
Career aspiration		.593
Grade point average		.555
Belief		
Parents morals are good for me		.554
Moral duty to obey the law		.545
School learning helps find job		.568
Simultaneous control on all 10 variables listed above (10th order partial)		.458

SUMMARY AND CONCLUSIONS

The primary purpose of this paper has been to review critically what is known about the delinquency-drug use relationship among adolescents. In doing so the focus has been on applying the widely accepted criterion of causality outlined by Hirschi and Selvin (1967): association, temporal order, and testing the relationship for spuriousness. The extant literature has consistently proven a statistical association between delinquency and drug use. There is also consensus that onset of delinquency usually precedes involvement with illicit drugs. The two studies (Elliott and Ageton 1976a; Johnston et al. 1978) that have most rigorously applied the third criterion of causality also agree that the delinquency-drug use relationship is spurious.

Data from a study of a representative sample of over 3,000 adolescents 12- to 17-years-old were analyzed with regard to the three criteria of causality. While previous findings about association and temporal order were confirmed, analysis of data from the Krohn and Massey (1979) study provides strong evidence that the delinquency-drug use relationship is not spurious.

This finding is quite important and deserves additional comment for several reasons. First, this is the first time that the delinquency-drug use relationship among adolescents has been systematically tested for spuriousness with the results supporting the causal instead of the spurious model. Second, the analysis on which these results were obtained was completely secondary (i.e., the data input was from a matrix in a paper unpublished at the time. Third, this study allowed for testing the relationship for spuriousness with a series of items derived from a widely accepted theory of deviance. One might conclude from these comments that there may be numerous data sets that could be "reanalyzed" using model A and the three criteria of causality as guides.

A preliminary list of such data sets would include the Treatment Outcome Prospective Study (TOPS), the youth sample from the Supported Work study, the national study of adolescent drinking behavior (Rachal et al. 1975), the various national surveys of high school seniors conducted annually by Johnston and his associates, and Howard Kaplan's ongoing longitudinal study of over 9,000 youths in the Houston area, to mention just a few.

It is also important to note again that the Krohn and Massey study was designed explicitly to test a theory of deviance. In recent years a great deal of attention has been devoted to refining and synthesizing extant theories of deviance (Elliott et al. 1979) and theories in the drug field (Lettieri et al. 1980). It is time for those studying drug use and delinquency among adolescents to move beyond description and into the etiology of those phenomena with vigor.

However, the implications of the finding that the delinquency-drug use relationship may be causal instead of spurious extend far beyond the empirical finding. Assume that the relationship, at least among "normal" adolescents, is causal. With such an assumption, it may be possible to devise efficacious early detection and drug education/prevention programs that fall much closer to the primary than the secondary and tertiary end of the prevention continuum. As Blum and Richards (1979) note:

> Drug abuse has become such a field in itself that its practitioners sometimes forget that their clients are by legal definition delinquents, and for those heavily drug involved, there are likely to be continuing nondrug crimes as well. (p. 263)

REFERENCES

Akers, R.L., Krohn, M.D., Lanza-Kaduce, L., and Radosevich, M. Social learning and deviant behavior: A specific test of a general theory. *Am Sociol Rev*, 44:636-655, 1979.

Ball, J.C., Levine, B.K., Demaree, R.G., and Neman, J.F. Pretreatment criminality of male and female drug abuse patients in the United States. *Addict Dis*, 1:481-489, 1975.

Barton, W.I. Heroin use and criminality: Survey of inmates of state correctional facilities, January 1974. In: Research Triangle Institute, *Appendix to Drug Use and Crime: Report of the Panel on Drug Use and Criminal Behavior*. Springfield, VA: National Technical Information Service. (NTIS No. PB 259 167), 1976. pp. 419-440.

Blalock, H.M., Jr. *Causal Models in the Social Sciences*. Chicago: Aldine-Atherton, 1971.

Blum, R., and Richards, L.G. Youthful drug use. In: DuPont, R.L., Goldstein, A., and O'Donnell, J.A., eds. *Handbook on Drug Abuse*. National Institute on Drug Abuse. Washington, D.C.: Supt. of Docs. U.S. Govt. Print. Off., 1979. pp. 257-270.

Chambers, C.D. Narcotic addiction and crime. An empirical review. In: Inciardi, J.A., and Chambers, C.D., eds. *Drugs and the Criminal Justice Systems*. Beverly Hills, CA: Sage, 1974. pp. 125-142.

Chein, I. Narcotics use among juveniles. In: Cavan, R., ed. *Readings in Juvenile Delinquency*. New York: Lippincott, 1964. pp. 237-252.

Chein, I., Gerard, D.L., Lee, R.S., and Rosenfeld, E. *The Road to H: Narcotics, Delinquency, and Social Policy*. New York: Basic Books, 1964.

Clayton, R.R., and Tuchfeld, B.S. The drug-crime debate: Obstacles to understanding the relationship. Unpublished.

Clayton, R.R., and Voss, H.L. *Young Men and Drugs in Manhattan: A Causal Analysis*, National Institute on Drug Abuse Research Monograph 39. DHHS Pub. No. (ADM)81-1167. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1981.

Cushman, P. Relationship between narcotic addiction and crime. *Fed Probation*, 38:38-43, 1974.

Duncan, O.D. *Introduction to Structural Equation Models*. New York: Academic Press, 1975.

Eckerman, W.C., Bates, J.D., Rachal, J.V., and Pooles, W.K. *Drug Usage and Arrest Charges: A Study of Drug Usage and Arrest Charges Among Arrestees in Six Metropolitan Areas of the United States*. Bureau of Narcotics and Dangerous Drugs, U.S. Department of Justice, Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1971.

Elliott, D.S., and Ageton, A.R. *Subcultural Delinquency and Drug Use*. Boulder, CO: Behavioral Research Institute, 1976a.

Elliott, D.S., and Ageton, A.R. The relationship between drug use and crime among adolescents. In: Research Triangle Institute, *Appendix to Drug Use and Crime: Report of the Panel on Drug Use and Criminal Behavior*. Springfield, VA: National Technical Information Service. (NTIS No. PB 259 167), 1976b. pp. 297-322.

Elliott, D.S., Ageton, A.R., and Canter, R.J. An integrated theoretical perspective on delinquent behavior. *J Res Crime Del*, 16:3-24, 1979.

Friedman, C.J., and Friedman, A.S. Drug abuse and delinquency. Part II. Drug use in three groups of lower social class adolescent boys. In: *Drug Use in America. Problems in Perspective. Appendix, Vol. I: Patterns and Consequences of Drug Use*. National Commission on Marijuana and Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973a. pp. 436-484.

Friedman, C.J., and Friedman, A.S. Drug abuse and delinquency. Part I. Drug abuse and delinquency among lower social class, court-adjudicated adolescent boys. In: *Drug Use in America. Problems in Perspective. Appendix, Vol. I: Patterns and Consequences of Drug Use*. National Commission on Marijuana and Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973b. pp. 398-436.

Gandossy, R. P., Williams, J.R., Cohen, J., and Harwood, H.H. *Drugs and Crime: A Survey and Analysis of the Literature*. Washington, D.C.: National Institute of Justice, May 1980.

Gold, M., and Reimer, D.J. *Changing Patterns of Delinquent Behavior Among Americans 13 to 16 Years Old, 1967-1972*. Ann Arbor, MI: Institute for Social Research, 1974.

Goode, E. Excerpts from marijuana use and crime. In: *Marijuana--A Signal of Misunderstanding. Appendix, Vol. I*. National Commission on Marijuana and Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973.

Gould, L.C. Crime and the addict: Beyond common sense. In: Inciardi, J.A., and Chambers, C.D., eds. *Drugs and the Criminal Justice System*. Beverly Hills, CA: Sage, 1974. pp. 57-75.

Greenberg, S.W., and Adler, F. Crime and addiction: An empirical analysis of the literature, 1920-1973. *Contemp Drug Prob*, 3:221-270, 1974.

Heise, D.R. *Causal Analysis*. New York: Wiley, 1975.

Hindelang, M.J., and Weiss, J.G. Personality and self-reported delinquency: An application of cluster analysis. *Criminol*, 10:268-294, 1972.

Hirschi, T. *Causes of Delinquency*. Berkeley: University of California Press, 1969.

Hirschi, T., and Selvin, H.C. *Delinquency Research*. New York: Free Press, 1967.

Hyman, H. *Survey Design and Analysis*. New York: Free Press, 1955.

Inciardi, J.A. Heroin use and street crime. *Crime Del*, 25:335-346, 1979.

Inciardi, J.A., and Chambers, C.D. Unreported criminal involvement in narcotic addicts. *J Drug Issues*, 2:57-64, 1972.

Inciardi, J.A., and Chambers, C.D., eds. *Drugs and the Criminal Justice System*. Beverly Hills, CA: Sage, 1974.

Jacoby, J.E., Weiner, N.A., Thornberry, T.P., and Wolfgang, M.E. Drug use and criminality in a birth cohort. In: *Drug Use in America. Problems in Perspective*. *Appendix*, *Vol*. *I*. *Patterns and Consequences of Drug Use*. National Commission on Marijuana and Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973. pp. 300-343.

Jessor, R. Predicting time of onset of marijuana use: A developmental study of high school youth. *J Consult Clin Psychol*, 44:125-134, 1976.

Jessor, R. Marijuana: A review of recent psychosocial research. In DuPont, R.L., Goldstein, A., and O'Donnell, J.A., eds. *Handbook on Drug Abuse*. National Institute on Drug Abuse. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979. pp. 337-356.

Jessor, R., and Finney, J. A social psychology of marijuana use: Longitudinal studies of high school and college youth. *J Pers Soc Psychol*, 26:1-15, 1973.

Johnson, B.D. *Marijuana Users and Drug Subcultures*. New York: Wiley, 1973.

Johnston, L.D. *Drugs and American Youth*. Ann Arbor, MI: Institute for Social Research, 1973.

Johnston, L.D., O'Malley, P.M., and Eveland, L.K. Drugs and delinquency: A search for causal connections. In: Kandel, D.B., ed. *Longitudinal Research on Drug Use*: *Empirical Findings and Methodological Issues*. Washington, D.C.: Hemisphere, 1978. pp. 137-156.

Joreskog, K.G. A general method for analysis of covariance structures. *Biometrika*, 57:239-251, 1970.

Kozel, N.J., DuPont, R.L., and Brown, B.S. Narcotics and crime: A study of narcotic involvement in an offender population. *Int J Addict*, 7:433-450, 1972.

Krohn, M.D., Akers, R.L., Radosevich, M.J., and Lanza-Kaduce, L. Norm qualities and adolescent substance use: The effects of norm quality and reference group on using and abusing alcohol and marijuana. Iowa City, IA: The University of Iowa, unpublished and undated paper.

Krohn, M.D., and Massey, J. Social bonding theory, drug use and delinquent behavior. Iowa City, IA: University of Iowa Sociology Working Paper Series, June 1979.

Lazarsfeld, P.F. Interpretation of statistical relations as a research operation. In: Lazarsfeld, P.F., and Rosenberg, M., eds. *The Language of Social Research*. New York: Free Press, 1955. pp. 115-125.

Lettieri, D.J., Sayers, M., and Pearson, H.W. *Theories on Drug Abuse, Selected Contemporary Perspectives*. National Institute on Drug Abuse Research Monograph 30. DHHS Pub. No. (ADM)80-967. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1980.

Lukoff, I.F. Issues in the evaluation of heroin treatment. In: Josephson, E., and Carroll, E.E., eds. *Drug Use: Epidemiological and Sociological Approaches*. New York: Wiley, 1974.

McGlothlin, W.H., Anglin, M.D., and Wilson, B.D. Narcotic addiction and crime. *Criminol*, 16:293-315, 1978.

Nurco, D.N. Etiological aspects of drug abuse. In: DuPont, R.L., Goldstein, A., and O'Donnell, J.A., eds. *Handbook on Drug Abuse*. National Institute on Drug Abuse. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1979. pp. 315-324.

Nurco, D.N., and DuPont, R.L. A preliminary report on crime and addiction within a community-wide population of narcotic addicts. *Drug Alcohol Dependence*, 2:109-121, 1977.

O'Donnell, J.A., Voss, H.L., Clayton, R.R., Slatin, G.T., and Room, R.G.W. *Young Men and Drugs: A Nationwide Survey*. National Institute on Drug Abuse Research Monograph 5. DHEW Pub. No. (ADM)76-311. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1976.

Rachal, V., Williams, J.R., Brehm, M.L., Cavanaugh, B., Moore, R.P., and Eckerman. *A National Study of Adolescent Drinking Behavior, Attitudes and Correlates*. Research Triangle Park, NC: Research Triangle Institute, 1975.

Research Triangle Institute. *Drug Use and Crime: Report of the Panel on Drug Use and Criminal Behavior*. Springfield, VA: National Technical Information Service, 1976.

Robins, L.N., and Murphy, G.E. Drug use in a normal population of young Negro men. *Am J Public Health*, 57:1580-1596, 1967.

Rosenberg, M. *The Logic of Survey Analysis*. New York: Basic Books, 1968.

Scott, P.D., and Willcox, D.R.C. Delinquency and amphetamines. *Br J Addict*, 61:9-27, 1965.

Single, E., and Kandel, D.B. The role of buying and selling in illicit drug use. In: Trebach, A.S., ed. *Drugs, Crime and Politics*. New York: Praeger, 1978.

Voss, H.L., and Stephens, R.C. Criminal history of narcotic addicts. *Drug Forum*, 2:191-202, 1973.

Weissman, J.C. *Understanding the Drugs and Crime Connection: A Systematic Examination of Drugs and Crime Relationships*. Madison, WI: STASH, 1979.

Weissman, J.C., Katsampes, P.L., and Giancinti, T.A. Opiate use and criminality in a jail population. *Addict Dis*, 1:153-165, 1974.

Weitzner, M., Smith, A., Pollack, H., Gerver, I., and Figlio, R.M. A study of the relationship of disposition and subsequent criminal behavior in a sample of youthful marijuana offenders in New York state. In: *Drug Use in America. Problems in Perspective. Appendix, Vol. I. Patterns and Consequences of Drug Use*. National Commission on Marijuana and Drug Abuse. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1973. pp. 798-809.

Winick, Charles. Some aspects of careers of chronic heroin users. In: Josephson, E., and Carroll, E.E., eds. *Drug Use: Epidemiological and Sociological Approaches*. New York: Wiley, 1974.

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Adolescence and Drug Abuse: Biomedical Consequences

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Many facets of the biomedical aspects of substance abuse in adolescents have not yet been adequately researched. Little is known about the biological elements, if any, that contribute to the genesis of substance abuse. In the instance of alcoholism a genetic vulnerability appears to be established from the studies of identical twins, one raised by the natural parent and the other placed at an early age in the home of nonalcoholic foster parents. In the studies conducted both in this country (Goodwin 1974) and in Denmark (Goodwin et al. 1973) the incidence of problem drinking of both groups of twins was similar. It is well established that among people of Mongolian descent, a widespread sensitivity to alcohol, based upon the rapid accumulation of acetaldehyde, is observed (Seto 1978). Facial flushing and more upsetting symptoms, including asthma and hypotension, can be present. In those with marked discomfort after drinking small amounts of ethanol, a certain preventive role is probably played by this inborn racial change in the ability to metabolize alcohol.

Such genetic factors have not yet been uncovered for other psychoactive drugs. With the recent identification of opiate (Synder 1977) and benzodiazepine (Braestrup and Squires 1978) receptor sites, and the hint that other drug-specific receptors will be found, it becomes conceivable that receptor site or endogenous ligand deficiency or excess may come to constitute one of the variables in the pathogenesis of the dependency disorders.

A fair amount of clinical and investigational information of varying "hardness" is available about the biomedical consequences of adolescent drug abuse. What remains essentially unknown is whether juveniles and adults respond to the mind-altering chemicals in a manner that is qualitatively or quantitatively different. Do young organisms manifest a relative psychophysiologic vulnerability to any of the drugs of abuse, as compared to the mature organism? Is it possible that differences in the rates of absorption, distribution, metabolism, and excretion may exist? Alternatively, adaptive mechanisms on a cellular or on the human level are likely to be differentially developed.

Since adolescence is a period of high drug abuse, and since subsequent careers of drug-taking are established and fixed at this time, the medical sequelae are of considerable interest. These effects will vary according to the drug group involved. In polydrug-abusing individuals the consequences tend to be greater than in monodrug abusers because of drug synergism, intensified psychic state, or drug-drug interactions.

CANNABIS

As the most widely used illicit drug, the impact of cannabis is of particular interest, especially since a more potent product is being smoked by younger age groups, with more daily smokers being counted. A controversy exists regarding the exact amount of harm that consistent smoking of marijuana can do. Dosage levels are obviously one of the interacting variables that determine whether adverse effects will occur.

The immediate side effects of cannabis use consist of acute anxiety, panic, and confusional and paranoid states. These side effects are infrequent, however. A small number of case reports of schizophreniform reactions has been reported in the American literature (Treffert 1978). These are probably psychotic reactions precipitated by marijuana in predisposed individuals. Impaired psychomotor performance for complex tasks has been well demonstrated (Willette 1977).[1] The impairment of immediate recall also seems well documented (Loftus 1980).

Intermediate side effects include flashbacks (an uncommon event) (Stanton et al. 1976), tracheobronchitis that is similar to tobacco smoker's cough (Henderson et al. 1972), and psychologic dependence (Nowlan and Cohen 1977). Immunologic (Cushman and Khurana 1977), chromosomal (Morishima et al. 1976), cellular protein synthesis (Blevins and Regan 1976), and hormonal changes (Smith et al. 1979) have been described, but these are difficult to evaluate, not only because they have not been invariably confirmed, but also because much of the work has been done on in vitro and animal preparations and their relevance to the human condition remains to be established. Now, nevertheless, sufficient evidence is accumulating, and these findings cannot be ignored.

Perhaps the most frequently asked question about cannabis is whether the amotivational syndrome (Kolansky and Moore 1972) that appears to occur most often in adolescents and young adults is a drug-related event, or whether the loss of drive and goal-directedness is primarily a psychosocial process that marijuana reinforces. It is most likely that both possibilities occur. For some, consistent usage will promote passivity and loss of motivation, for others who drop out because of situational and personality difficulties, marijuana will act as a satisfactory reinforcer.

The reduction in drive states seen in certain young users may have a biologic substrate. It may be a reflection of lowered drive hormones like testosterone or leutinizing hormone (Harclerode et al. 1979). It could represent the limbic system changes described by Heath et al. (1979). It is also quite likely that a good part of the picture can be accounted for by the sedative quality of marijuana. It is employed by some people for its tranquilizing and sleep-inducing effects. When large amounts of a sedative are used during the waking hours, it must be expected that a loss of ability to perform and a drop in motivation will result. Alcohol, opiates, and hypnosedatives will induce similar effects.

The long-term changes of concern include the possibilities of chronic obstructive lung disease and pulmonary carcinogenicity (Alper and Cohen, 1980). The comparison with tobacco is justified, since similar coal tars are present in both plants. The combined use of both products may be particularly undesirable (Tennant 1980). Whether cannabis produces physical dependence is contingent on dosage. In amounts not commonly used on the street at present, tolerance and a withdrawal syndrome are discernible on sudden discontinuance (Hollister 1979).

OPIATES

Most of the serious adverse consequences of opiate use are secondary to the contamination of the injected bolus. The exceptions include overdose and anaphylactic reactions (Cherubin 1968). Of the infections resulting from inattention to sterile techniques, hepatitis is the most frequent, almost invariable complication. Endocarditis, thrombophlebitis, and a variety of pulmonary insults are not infrequent. Metastatic infections originating from the heart valves and lungs can lodge in any organ and cause inflammatory reactions or abcess formation.

The dangers in the life of a heroin user must be noted: they include the "hot shot" (an intentionally lethal dose provided by the dealer) and other homicidal events, accidents due to oversedation, and diseases caused by malnutrition and poor hygiene. The rigors of withdrawal are not great at present, since only small amounts of the drug are to be found in the "bag," and detoxification facilities are generally available.

SEDATIVES

The intoxicated state, with its hazards from poor judgment, impaired motor skills, and irritability, contributes to accident proneness. Violent behavior is seen just as in the closely related alcohol-intoxicated states. Sedatives are the most frequently used chemicals for suicidal purposes, with the barbiturates being the preferential drugs for this use (Cohen and Blutt 1978).

Physical dependence occurs with continued use of sedatives. The withdrawal syndrome is more impressive than opiate withdrawal, and it can be life-endangering. Another ominous feature is that, although tolerance to large amounts of barbiturates takes place, the lethal dose may be only a few capsules more than the well-tolerated amount.

The combined use of sedatives with a related drug such as alcohol has resulted in fatalities even when the blood levels of both substances were at less than lethal concentrations. Barbiturates also interfere with the metabolism of a number of classes of therapeutic drugs, and may nullify the efficacy of these agents.

Adolescents appear to react much like adults to acute or chronic sedative abuse.

VOLATILE SOLVENTS

Volatile solvents have particular relevance for youths: they may be the initial drug abused by grammar and junior high school students (Carroll 1977).

Bass (1970) described a sudden sniffing death, that is, a cardiac arrest from a combination of the solvent, the relative unavailability of oxygen, and sensitization of the pacemakers of the heart to the overproduction of adrenalin in response to stress.

Depending upon the solvent, occasional peripheral nerve cell, liver, kidney, or bone marrow damage might occur. Heavy usage in children has resulted in neuropsychological deficits that have not cleared over a few months of abstinence (Berry et al. 1979).

HALLUCINOGENS

The acute toxicity of drugs such as LSD consists of anxiety, panic, and psychotic reactions. Prolonged psychotic reactions are likely to be underlying schizophrenic disorders unleashed by the hallucinogenic experience. Flashbacks are not uncommon and are more apt to occur in those who have had multiple LSD exposures (Stanton et al. 1976).

Certain features of the phencyclidine (PCP) state permit its inclusion with the hallucinogens (Lerner and Burns 1979). In addition, hypertension, ataxia, analgesia, amnesia, confusion, agitation, and depersonalization combine to induce behavioral toxicity greater than that seen with the LSD-type hallucinogens. A toxic and a schizophreniform psychosis have often been seen, the latter being difficult to differentiate from acute paranoid schizophrenia without blood or urine tests for phencyclidine. Therefore, acute psychotic breaks in youngsters should be checked with urinary PCP and amphetamine tests. A severe depression may occur during the waning phase of the experience.

PCP-related death can be caused by suicide, homicide, accident, respiratory depression, convulsions, or cerebral hemorrhage. The schizophrenic-like state may persist for weeks or months. Recurrences of the psychosis after recovery are possible without further drug ingestion. Multiple psychoses are observed in individuals who return to the use of PCP, in some instances because of amnesia regarding the psychotic experience. Violence is a real problem. During the sober interval after many PCP exposures, mood and thought disturbance may continue to be measurable.

STIMULANTS

The amphetamines are prototypical compounds of the stimulant class. Hypertension, arterial wall changes, heart rhythm disturbances, and convulsions are some of the occasional complications of high dose or prolonged use. The actual hypertension may cause cerebral hemorrhage and, as with PCP, this group is to be considered in instances of teenage stroke. Overdose is infrequent. A paranoid thought disorder or paranoid psychosis will emerge when the amphetamines are used in increasing quantities over time (Griffith et al. 1972).

Behavioral toxicity causes much of the morbidity and mortality associated with stimulant abuse, and its biochemical basis consists of increased availability of dopamine and norepinephrine at the neuronal synapse. Hyperactivity, impulsiveness, aggressiveness, and paranoid thinking combine to cause accidents and homicides. Suicide is a possibility during the withdrawal phase when serious depression can occur. A decade ago the fad of injecting enormous quantities of amphetamines became rather popular. This was the "speedfreak" phenomenon (Cohen 1969). Apparently, because of the intensity of the state and the miserable withdrawal period, the fad eventually subsided and hardly exists at present.

As a rule, adolescents only use cocaine occasionally, since it is priced out of the market for regular use. The intravenous use, and particularly the smoking of cocaine base (Jeri 1978) is much more likely to provoke adverse effects than snorting. These effects consist of strong psychological dependence, paranoid modes of thinking, heart rhythm irregularities, and the behavioral toxicity of the other stimulants.

ALCOHOL

Alcohol is mentioned here because it is a substantial adolescent problem in its own right (Blane and Hewitt 1977) and is often combined with the other drug classes already mentioned. In adolescents the excessive use of alcohol produces impaired behavioral controls. This can result in belligerence, accident proneness (especially while driving), impaired school performance, and problems involving the law. Young people drink less consistently than older people, but tend to consume more on a single drinking occasion (Third Special Report 1978). Therefore, the various chronic organ impairments are less likely to occur in youths than in adults. However, the age of first diagnosis of cirrhosis of the liver is decreasing, and 25- to 30-year-olds with cirrhosis, which takes 10 years or more of heavy drinking to develop, are being seen. The acute effects of heavy drinking, such as gastritis or bleeding peptic ulceration are more likely in the adolescent.

If heavy drinking patterns are established during the early years of life, they tend to persist. Then the biomedical consequences are considerable. Damage to the pancreas, liver, nerves, muscles, endocrine glands, heart, and brain become likely. In large quantities alcohol is a protoplasmic poison affecting all cells. Its first metabolic product, acetaldehyde, is believed to be responsible for some of the tissue damage (Korsten et al. 1975) in heavy drinkers. In addition, the acidic shift associated with alcohol metabolism affects carbohydrate, fat, and protein metabolism, producing a large array of disease states.

SUMMARY

The consequences of excessive drug use may be substantial. This is true for every abused drug, the only requirement being that sufficiently large amounts be taken over a sufficiently long period of time. In some instances the untoward effects are immediate, during the period of acute intoxication; in others they may be delayed for decades.

The adolescent, at a stage of psychophysical development when adaptive responses are being learned, is probably more vulnerable to the loss of learning time than the adult. If intoxication with the depressant class of drugs occupies much or all of the waking hours, or if the overuse of drugs becomes the only learned technique for coping with life stresses, the developmental process stops.

Since youth is a period of exploratory, risk-taking, sensation-seeking behavior, it is this group that has traditionally become over-involved in experiences such as drug misuse. It would be a major undertaking to understand the nature of adolescence and to develop strategies to reduce its destructiveness.

FUTURE RESEARCH DIRECTIONS

1. It is important to come to an understanding of the risk factors in cannabis use by adolescents, particularly the effect on the gonadal hormones and the question of amotivation. The matter of cannabis' carcinogenetic potential should also be studied. Certain clinical questions, such as whether daily cannabis use leads to increased vulnerability to infections in pre-adolescents and adolescents, could be determined with well-designed investigations of large samples.

2. It may be necessary to await additional basic information before a search for biomedical causes of various types of drug abuse in juveniles can be designed.

3. A search for any differences between adolescent and adult drug abuse effects would be well worth undertaking. An appropriate animal could be used for such comparative work.

4. Animal work with abusable psychoactive drugs should sometimes include younger experimental groups when the drug involved is favored by the youthful population, e.g., when the pharmacology of the solvents is being examined.

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5. When certain drugs, PCP for example, are particularly damaging and are widely used by teenagers, research into early intervention strategies seems worthwhile.

6. Something might be learned from a retrospective look at former "speedfreaks," why they quit, and their subsequent history. Perhaps the information may be applicable to some of today's drug abuse problems.

7. The causes and careers of amotivation require immediate research attention.

8. Cannabis use in the 8- to 11-year-old group must be studied to confirm or refute the impression that this age group is becoming more heavily involved

FOOTNOTE

[1] A brief review is given in Cohen, S. Cannabis and Driving, 1980.

REFERENCES

Alper, K., and Cohen, S. Pulmonary effects of marijuana. Drug Abuse Alcohol Rev, 3(1/2):1-13, 1980.

Bass, M. Sudden sniffing death. JAMA, 212(12):2075-2079, 1970.

Berry, G.J., Heaton, R.K., and Kirby, M.W. Neuropsychological assessment of chronic inhalant abusers: A preliminary report. In: Sharp, C.W., and Carroll, L.T., eds. Voluntary Inhalation of Volatile Solvents. DHEW Pub. No. (ADM)79-779. Washington, D.C.: U.S. Government Printing Office, 1979. pp. 111-136.

Blane, H.T., and Hewitt, L.E. Alcohol and Youth: An analysis of the literature: 1960-1975. Prepared for the National Institute on Alcohol Abuse and Alcoholism under Contract No. ADM 281-75-0026. Rockville, MD, 1977.

Blevins, R.D., and Regan, J.D. Delta-9-THC: Effect on macromolecular synthesis in human and other mammalian cells. Arch Toxicol, 35:127-135, 1976.

Braestrup, C., and Squires, R.F. Brain specific benzodiazepine receptors. Br J Psychiatry, 133:249-260, 1978.

Carroll, E. Notes on the epidemiology of inhalants. In: Sharp, C.W. and Braham, M.R., eds. Review of Inhalants: From Euphoria to Dysfunction. National Institute on Drug Abuse Research Monograph 15, DHEW Pub. No. (ADM)77-553. Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1977. pp. 13-29.

Cherubin, C.E. A review of the medical complications of narcotic addiction. Int J Addict, 3:163-176, 1968.

Cohen, S. Abuse of centrally stimulating agents among juveniles in California. In: Sjoqvist, F., and Tottie, M., eds. *Abuse of Central Stimulants*. Stockholm: Almqvist and Wiskell, 1969.

Cohen, S., and Blutt, M.J. Hypnotic drug therapy. *Drug Abuse Alcohol Rev*, 1(2):1-8, 1978.

Cushman, P., and Khurana, R. A controlled cycle of tetrahydrocannabinol smoking. T and B cell rosette formation. *Life Sci*, 20:971-980, 1977.

Goodwin, D.W. Drinking problems in adopted and nonadopted sons of alcoholics. *Arch Gen Psychiatry*, 31:164-169, 1974.

Goodwin, D.W., Schulsinger, F., Hermanson, L., Guze, S.B., and Winokur, G. Alcohol problems in adoptees raised apart from alcoholic biologic parents. *Arch Gen Psychiatry*, 28:238-243, 1973.

Griffith, J.D., Fann, W.E., and Oates, J.A. The amphetamine psychosis: experimental manifestations. In: Ellinwood, E.H., and Cohen, S., eds. *Current Concepts on Amphetamine Abuse*, DHEW Pub. No. (HSM)72-9085, Washington, D.C.: Supt. of Docs., U.S. Govt. Print. Off., 1972. pp. 185-191.

Harclerode, J., Nyquist, S.E., Nazar, B., and Lowe, D. Effects of testosterone on sex hormones and testicular enzymes of the rodent. In: Nahas, G.C., and Patton, W.D.M., eds. *Marijuana: Biological Effects*. New York: Pergamon Press, 1979. pp. 395-405.

Heath, R.G., Fitzjarrel, A.T., Garey, R.E., and Myers, W.A. Chronic marijuana smoking: Its effect on function and structure of primate brain. In: Nahas, G.C., and Patton, W.D.M., eds. *Marijuana: Biological Effects*. Pergamon Press, 1979. pp. 713-739.

Henderson, R.L., Tennant, F.S., and Guerney, R. Respiratory manifestations of hashish smoking. *Arch Otolaryngol*, 94:248-251, 1972.

Hollister, L.E. Cannabis and the development of tolerance. In: Nahas, G.C., and Patton, W.D.M., eds. *Marijuana: Biological Effects*. New York: Pergamon Press, 1979. pp. 585-590.

Jeri, F.R. The syndrome of coca paste. *J Psychedelic Drugs*, 10:361-370, 1978.

Kolansky, H., and Moore, W.T. Clinical effects of marijuana on the young. *Int J Psychiatry*, 10:55-67, 1972.

Korsten, M.A., Matzusaki, S., Feinman, L., and Lieber, C.S. High blood acetaldehyde levels after ethanol administration. Differences between alcohol and nonalcohol subjects. *N Eng J Med*, 292(8):386-389, 1975.

Lerner, S.E., and Burns, R.S. Youthful phencyclidine (PCP) users. In: Bechner, G.M., and Friedman, A.S., eds. *Youth Drug Abuse*. Lexington, MA: Lexington Books, 1979.

Loftus, E.F. Alcohol, marijuana and memory. Psychol Today, 13:42-56, 1980.

Morishima, A., Milstein, M., Henrich, R.T., and Nahas, G.C. Effects of marijuana smoking, cannabinoids and olivitol on replication of human lymphocytes: Formation of micronuclei. In: Braude, M., and Szara, S., eds. Pharmacology of Marijuana. New York: Raven Press, 1976. pp. 711-722.

Nowlan, R., and Cohen, S. Tolerance to marijuana: Heart rate and subjective "high." Clin Pharmacol Ther, 22(5):550-556, 1977.

Seto, H. Biochemical correlates of ethanol-induced flushing. J Stud Alcohol, 39:1-11, 1978.

Smith, C.G., Smith, M.T., Besch, R.G., and Asch, R.H. Effect of delta-9-tetrahydrocannabinol on female reproductive function. In: Nahas, G.C., and Patton, W.D.M., eds. Marijuana: Biological Effects. New York: Pergamon Press, 1979. pp. 449-468.

Stanton, M.D., Mintz, J., and Franklin, R.M. Drug flashbacks II. Some additional findings. Int J Addict, 11(1):53-69, 1976.

Synder, S.H. Opiate receptors and internal opiates. Sci Am, 236:44-67, 1977.

Tennant, F.S. Histopathologic and clinical abnormalities of the respiratory system in chronic hashish smokers. Substance Alcohol Actions/Misuse, 1:93-100, 1980.

Third Special Report to the Congress on Alcohol and Health Technical Support Document. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978.

Treffert, D.A. Marijuana use in schizophrenia: A clear hazard. Am J Psychiatry, 135:10, 1978.

Willette, R.E., ed. Drugs and Driving, National Institute on Drug Abuse Research Monograph 11. DHEW Pub. No. (ADM)77-432, Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1977.

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Executive Summary, Discussion, and New Directions for Research

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The spread in the use of marijuana and other illicit drugs represents one of the most striking instances of social change of the last decade. The health consequences of this change are of special concern because they involve young people at most crucial and vulnerable phases of their biological and psychological development, and because increasing drug usage has been accompanied by decreasing age of initiation into drugs and by peak rates of use in the years of young adulthood when individuals must make commitments regarding family and work participation.

In addition to laboratory and field surveys, our knowledge of the antecedents and consequences of drug behavior has been greatly enhanced by longitudinal followup studies of normal populations of youths that have observed young people both before and after they get involved in drugs. Most of the completed studies have dealt with adolescents. Only recently have a number of new studies been initiated that follow young people into young adulthood to provide much-needed data on the potential consequences of drug use on psychosocial functioning in early adulthood. At this time, more is known about the psychosocial determinants than the consequences of adolescent drug behavior. In particular, longitudinal studies have defined the developmental process of involvement in drugs in which experimentation with one of the legal drugs is a necessary, although not sufficient, experience for subsequent experimentation with other illicit drugs. Many of the factors found to be related to drug usage at one point in time are, in fact, precursors to drug use, with different factors predicting initiation into different stages of use. Peer influences and attitudes favorable to marijuana use are especially important for initiation to marijuana. Poor relationships with parents, feelings of depression, and peer influences predict initiation into more severe illicit drugs. The data so far do not indicate that marijuana use is associated with any increases in criminal activity. The evidence concerning effects on the "amotivational syndrome" is ambiguous. Newly initiated followup studies in early adulthood and studies that focus on daily users will provide information about the social functioning of drug users in young adulthood.

Epidemiology

The most recent epidemiological data on drug use patterns in the 12 to 21 age group are provided by two series of nationwide surveys: the national survey of high school seniors (Johnston, Bachman and O'Malley, 1979) and the national survey of the household population aged 12 and older (Fishburne, Abelson and Cisin, 1980), both funded by the National Institute on Drug Abuse. The use of alcohol and cigarettes typically precedes the first marijuana experience. About half of those who try marijuana in their teen years eventually progress to stronger drugs. Those who begin marijuana use at an early age are more likely to progress to the use of "stronger" drugs.

First use of marijuana typically occurs prior to the senior year of high school, but first use of such drugs as cocaine or hallucinogens is most likely to take place in late adolescence.

Opportunity to try marijuana is an important factor in prevalence rates. The large majority of 12- to 13-year-olds have never had the chance to try marijuana, and indeed, less than 10 percent of this age group have ever used the drug. In contrast, 83 percent of 18- to to 21-year-olds have had an opportunity to try marijuana, and 69 percent have "ever used." Less than 10 percent of these say they have used on only one or two occasions; most have used many more times.

Few young persons take advantage of their first opportunity to try; repeated exposure to marijuana-using peers seems to be necessary. The "time lapse" across first acquaintance with a marijuana user, first opportunity, and first use suggest that few young persons "seek out" the chance to try marijuana.

Personality and Sociodemographic Factors

The relationship between personality factors and drug abuse is not clear-cut, and findings are frequently contradictory. However, findings suggest:

- The single personality dimension most linked with drug abuse is lack of traditional values and related dynamics: rebelliousness, resistance to traditional authority and social structures, high need for autonomy, and social alienation (but not personal alienation).

- Characteristically, studies find weak correlations between lower self-esteem and drug use. One study, however, found depression to be an important variable in drug use.

- Some relationship exists between high sensation seeking and drug use.

- The majority of correlational studies have failed to find convincing evidence of gross pathology in samples of drug users as compared to non-users.

- Among college-age populations, marijuana use has become the normal behavior so that the personality variables associated with drug users in college tend to be those for the age group as a whole.

Sociodemographic factors indicate:

- Age for licit or illicit drug experimentation begins in teens and begins to recede by mid-20's. The age of first marijuana use seems to be decreasing, but the age of initial heroin use is increasing.

- Sex differences in drug use are disappearing, but remain for certain classes of drugs and age groups.

- Socioeconomic status has not been demonstrated as a powerful predictor of drug use when considered alone.

- Religiosity is consistently correlated with lower incidence of drug use.

- Most recent studies of marijuana and alcohol use in college samples have not found racial differences; however, among younger adolescents, researchers find an overrepresentation of blacks, Hispanics, and Native Americans among users of some drugs other than marijuana.

Peer and Family Influence

The family and peer group are the adolescent's primary sources of socialization, but there is considerable disagreement about the relative contributions of each group with respect to drug abuse. Hirschi's theory suggests that parents have a direct, independent effect on their adolescent's delinquent behavior regardless of peer group. Sutherland's theory, on the other hand, asserts that the crucial factor in adolescent delinquent behavior is the availability of deviant role models in the peer group. Other approaches view influence as situation- or domain-dependent.

Kandel has proposed a developmental model for three stages of drug use: initiation into hard liquor, marijuana, and other illicit drugs. Kandel suggests that parents play a substantial and specific role in influencing adolescent use of hard liquor. This is through a direct modeling effect and parenting styles in approaching adolescent liquor use. A reasoned, democratic parenting style may have a positive effect on adolescent drug use, as will good parent-child relationships.

Parental influence, however, is quite small with regard to initiation of marijuana use. In contrast to liquor, adolescent initiation into marijuana was virtually unrelated to any type of drug used by parents. Parental influence is based only on attitudes and closeness of relationship.

Initiation into use of illicit drugs other than marijuana appears to be strongly related to parental influence, particularly the quality of the parent-child relationship. Parental drug use is also a predictor.

Delinquency and Drug Use

The three criteria of causality, as outlined by Hirschi and Selvin, are association, temporal order, and testing the relationship for spuriousness. The extant literature has consistently proven a statistical association between delinquency and drug use. There is also a consensus that the onset of delinquency temporally precedes involvement with illicit drugs. The two studies that have most rigorously applied the third criterion, testing for a spurious relationship, have also agreed: the delinquency-drug use relationship is spurious. A third analysis by Krohn and Massey disagrees and provides strong evidence that the delinquency-drug use relationship is not spurious. Obviously, further work is needed in this area.

Biomedical Consequences of Drug Use in Adolescence

A genetic vulnerability factor has been established for alcohol abuse. Such genetic factors have not yet been uncovered for other psychoactive drugs, but the recent identification of opiate and benzodiazepine receptor sites seems to indicate that there may well be a biological basis for susceptibility to dependency disorders.

The effects of drugs on adolescents are open to further study. Are the effects in terms of absorption, distribution, metabolism, and excretion different for young organisms versus mature organisms? What are the effects on developing endocrine systems and psychosocial development?

Cannabis, the most widely used illicit drug, can cause these side effects, albeit infrequently: acute anxiety, panic, and confusional and paranoid states. Impaired psychomotor performance in complex tasks and reduced peripheral vision have been demonstrated with special implications for driving. Impairment of immediate recall seems well documented, with possible implications for learning. Continued use of cannabis undoubtedly results in lung damage, and it may be a carcinogen with effects similar to those of tobacco.

Most of the serious adverse consequences of opiate use are secondary to the contamination of the injection site, although overdose and anaphylactic reactions are very real, direct dangers. Of the secondary infections, hepatitis is most frequent, with endocarditis, thrombophlebitis, pulmonary insults, and metastatic infections also possible.

Sedatives cause physical dependence with continued use, and unsupervised withdrawal from sedatives can be a life-threatening event. Further, although tolerance to large amounts of barbiturates takes place, the lethal dose may be only a few capsules more than the amount well tolerated. The combined use of sedatives and alcohol can easily be fatal, and this seems to be the combination of choice for suicides. Barbiturates also interfere with certain therapeutic drugs, nullifying their effect.

Volatile solvents are particularly dangerous for youth. A "sudden sniffing death" syndrome has been described, as well as nerve, liver, kidney, and bone marrow damage. The damage is not reversible with abstinence.

Hallucinogens typically produce anxiety, panic, "flashbacks," and psychotic reactions. Phencyclidine (PCP), a particularly toxic hallucinogen, can cause hypertension, ataxia, analgesia, amnesia, and a schizophreniform psychosis difficult to distinguish from the real thing. The psychosis lasts for months and may recur without further drug ingestion. Death may result from suicide, homicide, accident, cerebral hemorrhage, or overdose.

Stimulants may cause hypertension, arterial wall changes, heart rhythm disturbances, convulsions, and cerebral hemorrhage. A paranoid thought disorder may be associated with prolonged use.

Discussion

The Epidemiology of Drug Use Among Adolescents
... Judith Droitcour Miller

The need to take a broader perspective in investigations of drug use was the primary theme of the discussion. More specifically, the reviewers suggested that such research should include a broader age span, a consideration of polydrug use, especially drugs used concurrently with marijuana, and more sensitive treatment of sex differences in drug use.

Two age groups adjacent to adolescents were of particular interest--young adults and older children (9 to 13 years). An interest in the changing nature of drug use across the lifespan was an underlying concern regarding both age groups. A general hypothesis was that the availability or perceived availability of drugs determines, in part, the sort of drugs used by a particular age group. Older children might find it easier to obtain marijuana than alcohol. Likewise, young adults may switch from marijuana or other illicit drugs to prescription drugs when adult status makes prescriptions more readily available.

Survey data concerning these possible trends in drug use were discussed. It seems clear that marijuana use is increasing among older children, but drug use trends among young adults are unclear and must be examined with caution for possible cohort effects. Some cohort effects may not become apparent for years (e.g., "drug era" adolescents will not reach middle age for at least another decade).

The study of drugs used concurrently with marijuana was also discussed with interest. Some survey data indicate that the use of marijuana is rising faster than the use of other illicit drugs—thus, the proportion of marijuana users who use other drugs may be declining. This may indicate a change in the nature of drug use—fewer adolescents may be proceeding from the stage of marijuana use to the use of other drugs.

A final area of discussion concerned sex differences in drug use. It was hypothesized that drugs are used (or abused) to cope with life crises. The types of drugs used may depend upon availability for a particular age group and the sex of users within the age group. Survey data indicate men use more illicit drugs than women during adolescence, but that more women use more psychoactive prescription drugs than men during adulthood. However, men use more alcohol in adulthood.

The discussion clearly brought out the need for consideration of a broad range of factors—age group, availability of drugs, cohort effects, patterns of drug use, sex differences, and types of drugs (illicit drugs, prescribed drugs, and alcohol)—for a fuller understanding of the epidemiology of drug use among adolescents.

New Directions for Research

More information is needed about drug abuse among special adolescent population groups that are typically excluded from national survey frames. Some of these groups, such as high school dropouts, young members of the armed forces, and residents of college dorms, may be of particular interest since they may be characterized by higher levels of involvement with drugs than their same age peers who are more routinely studied. Most population groups are included in some national surveys of drug use, but the problem is that the number of respondents may not be large enough for reliable estimates in small population groups. A remedy for this problem might involve pooling data from several survey years or oversampling for these special population groups.

Discussion

Personality and Sociodemographic Factors in Adolescent Drug Use

... Kelin E. Gersick

Three major directions were suggested for future research concerning personality factors underlying drug use:

- Incorporation of a developmental perspective;
- The need to understand the role of personality factors and drug use in context; and
- The need to understand drug use as it relates to other deviant behavior.

The role of personality factors in drug use had little predictive value. Previous research has primarily involved cross-sectional studies of the relation between static personality traits and drug use, and such research cannot directly address questions concerning antecedents and results or reciprocal influences between drug taking and personality. Longitudinal, developmental studies of personality and drug use, including drugs besides marijuana, were suggested as a more effective means for achieving an understanding of the dynamic interplay between personality development and drug-taking behavior.

Another criticism of previous personality research was the failure to place behavior in context. Consideration of the historical context may reveal conformity for predicting abstention from drug use in the past, but abuse in the present. The nature of the immediate social context, such as the peer group, may lead to differential influence of conformity on drug taking depending upon dominant group values (e.g., conformity to the values within a Christian youth group may lead away from use of illicit drugs). Thus, the reviewers felt the study of personality in isolation from context had less predictive and explanatory value. More "ecological" research was recommended.

The final observation was the need to study drug use as it relates to other deviant behaviors. It was felt that the factors that characterize drug use might also characterize such behaviors as early premarital sex, juvenile delinquency, and other deviant activities. Thus, a common predisposition might yield a tendency to engage in a variety of deviant behaviors. In addition, involvement in one deviant activity might be related to involvement in another. However, possible predispositions to deviant activity must also be studied in context—what is deviant within one peer group may not be so within another, even if the society at large views the activity as deviant.

In summary, the reviewers suggested studying personality development and drug-taking behavior as it occurs within specific contexts and as it relates to other deviant activities.

New Directions for Research

1. More attention should be given to the role of developmental factors in drug abuse. Variables such as chronological age or school grade fail to capture the quality of development within the child. The stage of development may be more important than standard factors in determining the nature of a child's behavior or the meaning of a situation to the child. Research that can identify adaptive and maladaptive phasing of different kinds of stages--drug use, cognitive development, moral development, social skills--would be particularly useful.

2. An anthropological approach should be used to detail the characteristics of particular social environments and points in time. Context is extremely important in the consideration of psychosocial behaviors such as drug use. Thus, we require more specific data on differences within racial and ethnic categories and between neighborhoods, and greater attention to cohort effects and rapidly changing cultural events.

3. Researchers who make an effort to reach "hard to get" populations (e.g., 8- to 11-year-olds) and use innovative data-gathering techniques should be rewarded. For example, one experimenter trained children to collect data through interviews.

4. Some research should be conducted on the correlates (e.g., religiosity) of non-use of drugs in high-risk areas.

Discussion

From Family to Peer: Transitions of Influence Among Drug-Using Youth
... Thomas J. Glynn

The discussion of family and peer influences centered around:

- A model for conceptualizing the dimensions of parent and peer influences; and
- The nature of the influences of parents and peers.

A model for characterizing parent and peer influences consisted of behavior, attitudes or values, and the quality of the relationship. Behavior was seen as influencing the child through modeling, attitudes as affecting the child's thinking or decision making, and the quality of the relationship as affecting psychodynamic processes within the child. The reviewers recommended that the investigator in any study make clear which influence is under investigation. Modeling of parental drinking has been related to alcohol use among adolescents, whereas the quality of the parent-child relationship seems to affect drug taking.

The reviewers discussed parent and peer influences as being complex and interlocked--an "either/or" model was seen as too simplistic. Neither parents nor peers totally influence the adolescent in all areas, although the influence of one may be more powerful with respect to specific areas. However, it is likely that both will have some influence in most areas. For example, although the influence of peers may dominate concerning marijuana use, the quality of the relationship with parents may exert some influence.

Two aspects of parent and peer influence were explored in depth: the social context and the nature and quality of parent and peer relationships. The advent of the "youth culture" confirms the feeling of many parents: certain aspects of adolescent behavior are largely under the influence of autonomous social systems (e.g., adolescent dating) and are not under the control of parents. The embeddedness of deviant activities within such autonomous social systems must be understood if such activities are to be brought under control. The suggestion was that parents must organize to "get around" or gain control of such a system if the behavior in question is to be influenced.

Peer relationships were described as short-term and relatively casual when compared to the long-term and deeper relationships children have with their parents. Thus, there was some speculation that peer relationships exert influence primarily through modeling, whereas parent-child relationships not only influence behavior through modeling, but also exert deeper influences on the development of the child's character and values. There was mention, however, of the intensity and importance of a peer relationship while it lasts. One study showed the best friend, not parents, to exert an influence on marijuana use.

Since peer relationships are relatively brief, in many cases, short-term longitudinal studies of concurrent parent-child and peer relationships were suggested as a means for investigating this little-explored area.

New Directions for Research

1. Age of first drug experience is getting lower with each epidemiological report. How will relative family and peer influence change as age of first drug use lowers? Since data now suggest that parental modeling is the most important predictor for adolescent initiation into alcohol use, and peer modeling for marijuana use, will the strength of these influences change as they are applied to younger children or will the same patterns be followed, only earlier?

2. Does initiation into drug use lead the adolescent to association with drug-using peers or does association with drug-using peers lead to drug use? This classic question, although posed in an "either/or" fashion, will have many qualifiers when addressed by research (e.g., a finding might be "association with drug-using peers is related to initiation of use, but parental influence determines the extent of that use"). Nevertheless, this question has thus far resulted in data that support both positions and is clearly in need of further research.

Discussion

The Delinquency and Drug Use Relationship Among Adolescents: A Critical Overview

... Richard R. Clayton

The nature of the causal relationship between delinquency and drug use predominated in this discussion. The primary question was the direction of causality—does delinquency lead to drug use or the reverse? Such a question should be considered within a broad theoretical context of deviance.

The primary research suggestion was that a "microscopic" look be taken at the interrelationships between daily drug taking and engagement in delinquent activities. It was hypothesized that when drugs are being taken on a daily basis, there is more of a tendency to become involved in crime than when the same person is not taking drugs on a daily basis. An important recommendation was that the person's degree of involvement in drug and crimes be considered in such an investigation.

New Directions for Research

1. The causal nature of the delinquency-drug relationship needs investigation. Extant data sources ought to be reanalyzed using the criteria of causality articulated by Hirschi and Selvin (association, time-order of occurrence, and testing for spuriousness), the elaboration and techniques of Lazarsfeld, Hyman, and Rosenberg at the nonparametric level, and Blalock, Heise, and Duncan at the parametric level.

2. More attention should be given to the intersection of drug using and delinquent episodes, studied intensively over time in longitudinal studies of adolescents moving toward young adulthood. A promising approach might be a modification of the crime days concept (i.e., "drug days") developed by Ball et al.

3. Considerably more research is needed on the utility of the concept of deterrence, particularly perceived certainty of detection and sanction, found in the work of Erickson and Gibbs, as it relates to delinquent and drug-using behaviors among youth.

4. The effects of changes in the age structure on present and projected future rates of both drug use and delinquency have been virtually ignored, except for Zimring's "Bright" paper commissioned by the National Institute of Juvenile Justice and Delinquency Prevention (1975), and Toby's succinct piece in the New York Times (1977).

5. The National Institute on Drug Abuse should encourage efforts to integrate theories of delinquency and deviance with theories about drug abuse.

Discussion

Adolescents and Drug Abuse: Biomedical Consequences
... Sidney Cohen

A traditional hypothesis discussed was the possible physiological predisposition of some individuals to drug abuse. However, most heavy drug abusers take drugs to make themselves "feel better" (e.g., to allay depression or a lack of feeling). The perceived effects of drugs (i.e., how they make people "feel better") are poorly understood. Recent research on "receptors" may, however, cast new light on the effects of drugs and the reasons for certain drug actions.

One interesting hypothesis was offered during the discussion that illustrates the inseparability of the physiological and psychological aspects of drug taking. Many heavy drug or alcohol users report a "big bang" when they are "high" or "intoxicated." This psychological state is described as something that cannot be well understood by those who have not experienced it. There was a "hunch" that there may be a physiological reason for experiencing such states. Further work is needed in this area of investigation.

New Directions for Research

1. Research is needed comparing the effects of drugs on the young and adults. Virtually all of the research concerning drug effects uses adult subjects, animal or human. It is known that reactivity to drugs varies with age and stage of development; however, little is known about the nature of this reactivity, physiologically and psychologically. Some drugs may have an adverse effect on children and not on adults (e.g., adolescents may experience the "amotivational syndrome" with heavy marijuana use, whereas this condition is less frequent among adult users).

2. There is little research concerning the long-term effects of marijuana use. It is very probably carcinogenic: coal tars from marijuana produce cancer on rodent skin similar to that produced by cigarette tars. Marijuana may have harmful effects on the hormonal systems, and the "amotivational syndrome" may accompany heavy marijuana use. More research is needed to understand the physiological and psychological effects of marijuana use.

3. Little is known about the subsequent life experience of former abusers of "fad" drugs, such as "speed freaks." Why did they start? Why did they stop? What have been the long-term consequences of their drug abuse experience? A retrospective or followup study of former "speed freaks" might yield valuable insight for prevention and treatment.

GENERAL RESEARCH SUGGESTIONS

There was general agreement that research should involve younger cohorts in longitudinal studies of development and should examine drug use in context. Such studies are enormously complex, and discussion centered about problems of analyzing data from large-scale, longitudinal investigations.

There are methodological problems with such studies. Little consistency exists in design when longitudinal studies are contrasted, so problems in comparability appear. One specific methodological problem with longitudinal studies is determining the proper time intervals for followup.

A more practical problem with longitudinal studies is the lack of time to analyze the mass of data. If adequate time is not taken, the results are little more than descriptive. It was suggested that the National Institute on Drug Abuse provide additional resources and funding to assist in the design and data analysis of the large-scale studies that are required for the effective investigation of drug abuse among adolescents.

REFERENCES

Toby, Jackson. A Prospect of Less Crime in the 1980's. New York Times, October 26, 1977.

Zimring, Frank. Dealing with Youth Crime--National Needs and Federal Priorities. Paper prepared for the Coordinating Council on Juvenile Justice and Delinquency Prevention. September 1975.

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